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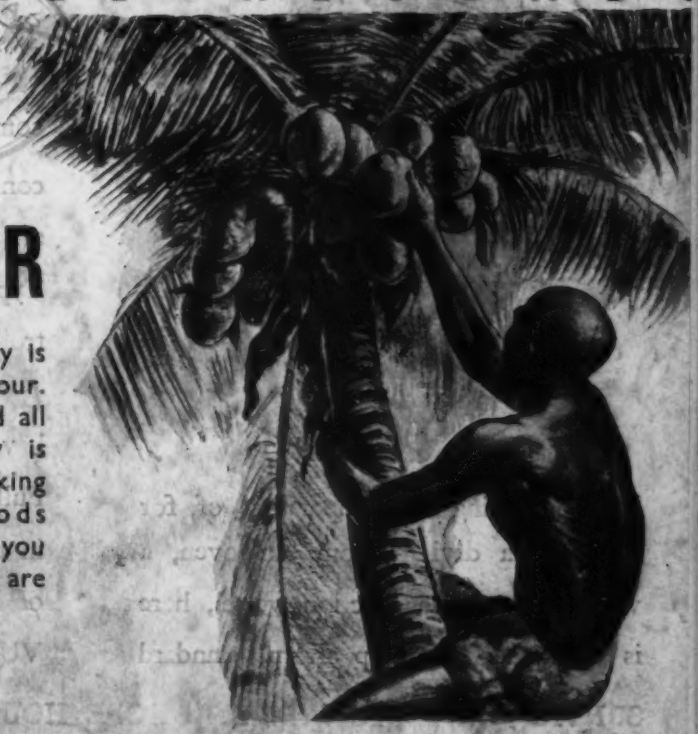

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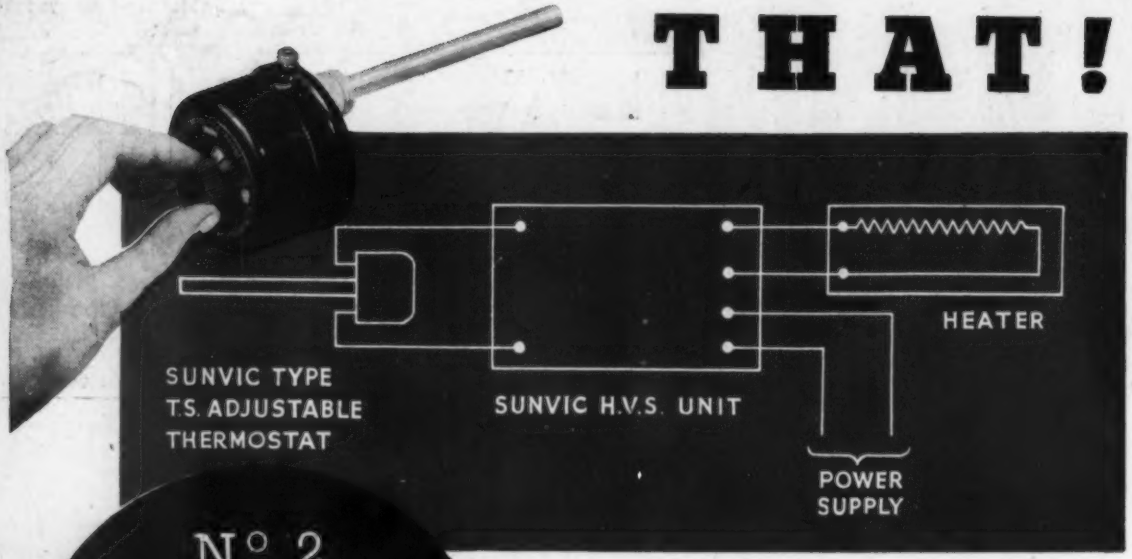

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FOOD MANUFACTURE

Vol. XX, No. 1 January 1, 1945

Contents

	Page
Editorial	1
Ice Cream Manufacture. Clifford Skertchly	5
The Future of Bakery Craft	8
Air-Conditioned Kippers. Specially Contributed	9
Books Received	12
Spice Contamination and its Control. J. Yesair and O. B. Williams	13
The Biscuit Industry	16
Correspondence	17
Compression of Dehydrated Vegetables	18
The Proper Use of Fuel	18
Research in New Zealand	19
The Coming Battle for Wheat. J. C. Lumsden	21
From Davenport to Llewellyn	22
Food Technology	23
War-Time Leases	23
Canned Frogs. Eric Hardy	24
Reformers of the Englishman's Food. M. Schofield, M.A.	25
Personnel for Industry	27
Income Tax and Scientific Research	27
Bacteriological Examination of Hams	28
Hydrolysis of Starches	28
News	29
Information and Advice	37
Recent Patents, Trade Marks and New Companies	38

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

January, 1945

A New Milk Product

A NEW form of frozen evaporated milk which, when reconstituted, is said to be difficult to distinguish from fresh milk, has been produced by F. J. Doan and J. G. Leeder at the Pennsylvania Agricultural Experimental Station. The process is as follows: First, the liquid milk, which should be of good quality, is pasteurised—preferably by the H.T.S.T. method. Then it is evaporated to about one-third of its original volume, care being taken to avoid copper contamination. Homogenisation follows, after which the milk is put through an ice cream freezer and, after packaging, is stored in a cold room at a temperature not above −10° F. and held at that temperature until delivered to the consumer. Distribution can be carried out in a similar manner as for other frozen foods. The pioneers of the process suggest that it may be desirable to clarify the milk before pasteurisation, as a sediment has occasionally been observed in some of the samples.

Doan and Leeder believe that frozen milk might be used in place of evaporated milk, over which it is said to have distinct advantages. They believe it has big possibilities on board ship, where it would be a more natural fluid milk than that normally used.

In the evaporation process a condensation ratio of approximately 3 to 1 has given the most satisfactory results. A lower ratio adversely affects the fat emulsion and also involves the freezing of more water per pound of milk solids. A condensation ratio of 3 to 1 on a volume basis is equivalent to a ratio of about 2·82 to 1 on a weight basis, but some air is incorporated into the product during the initial freezing in the ice cream plant.

The milk, after being evaporated and homogenised, is cooled to 40° F. or even lower in readiness for the initial freezing, which should, if possible, be carried out in a continuous freezer as the milk can be frozen more rapidly, a stiffer freeze can be obtained and—an important point—the amount of air incorporated can be held at a minimum. The frozen product may also be packaged direct from the freezer. The final freezing can be conducted in an ordinary commercial ice cream hardening room.

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Dehydrated Bananas and Onions

Dehydrated bananas have arrived from Canada. This new form of the little-seen banana is packed in a white airtight cardboard packet, not unlike the familiar carton in which is packed the powdered egg. The banana, which is usually in powder form, although it is sometimes solid by the time it reaches this country, only needs a little milk to restore it. It is in common use in Canada, where many people sprinkle it over their cereal to flavour it. Others use it as a sandwich spread. Another dehydrated product common in the Dominion is the onion. They are similarly packed, but, instead of being powdered, they take the shape of cornflakes, the difference being that they are white. They are soaked for a short time in water, in which they swell to their usual size. Many Canadian housewives do not bother about the soaking, but simply add the flakes to their cooking for flavouring.

The Labour Outlook

The White Paper on "Re-allocation of Man-Power between Civilian Employments during any Interim Period between the Defeat of Germany and the Defeat of Japan" (Cmd. 6568) gives food manufacturers a little further insight into the shape of things to come in the field of labour. Paragraph 9, for instance, states that on application the following classes of persons (called Class K) will be given permission, if they wish, to leave their jobs and retire from industry immediately the war in Europe ends, *irrespective of the production on which they are engaged*:

(1) Women, married or single, with household responsibilities and women wishing to join their husbands on release from the Forces.
(2) Other women over 60.
(3) Men over 65.

In addition, women over 50 will be permitted to leave their jobs and retire unless there are strong production reasons to the contrary. Class K may be extended from time to time. Persons in this class who do not wish to retire may, in the absence of strong *production* reasons to the contrary, be transferred to other employment or to work nearer to their homes.

The Essential Work Orders will be retained during the interim period, but they will not necessarily apply to the same industries as at present. It is impossible to say whether they will continue to apply to food undertakings that are at present scheduled, but in any case Class K workers and women over 50 as previously described will be able to claim their discharge or release from scheduled undertakings. The Control of Employment (Directed Persons) Order will be retained and administered on much the same lines as the Essential Work Orders. A new Control of Engagement Order will be issued and will apply to all employments. It will be limited to men between the ages of 18 and 50 and women between the ages of 18 and 40.

Juveniles (both sexes) under 18 will be freed from all control of engagement. A scheme is being prepared to assist them in the choice of employment, with a view to giving them the best opportunities for a progressive career, with due regard to their individual abilities. The Registration for Employment Orders will be retained, but no action will be taken under them in regard to persons in Class K. The Notice of Termination of Employment Order will be discontinued.

New Marketing Scheme "Presented"

The new draft marketing scheme for milk distribution, prepared by the Central Milk Distributive Committee at the request of Lord Woolton when Minister of Food, has been presented to the Ministers of the Crown concerned. A few days before the scheme was presented a number of amendments were made in the original draft. These were the outcome of representations made by various trade interests represented on the Central Committee. The definition of sterilised milk in clause 3 has been amended to read as follows:

> Sterilised milk means milk which having been homogenised and put into bottles capable of a vacuum seal is subjected to treatment for such a time as will ensure that if kept under proper conditions and unopened it will remain fit for human consumption for at least seven days.

Although the marketing scheme does not apply to manufactured milk products, milk manufacturers whose creameries are used as liquid milk depots or as wholesaling centres will come within its provisions. At the present time a large proportion of the creameries in England and Wales are dealing in liquid milk. The classification of wholesale dairies and milk depots under the scheme is therefore important to milk manufacturers. Clause 18 (6) (*f*), which deals with this matter, has been redrafted. There are now four classes of retailers, according to the daily gallonage handled. Wholesalers are classified as small, medium, or large according to their average daily sales by wholesale in the preceding "record" year. The "record" is kept by the Board and shows the gallonage of milk sold by every registered distributor each year. Small wholesalers are those whose sales did not exceed 500 gallons daily in the preceding record year; medium wholesalers those whose business was between 500 and 1,500 gallons daily; and large wholesalers those selling more than 1,500 gallons daily. Depot proprietors are classified as small or large according to their sales in the whole of the preceding record year, the

groups being those selling 1,500,000 gallons or less and those selling more than 1,500,000 gallons. The amended clause also provides that, so far as is practicable, the persons to be elected to the Board by retailers, wholesalers, and depot proprietors respectively shall be elected in equal numbers by each sub-class. This means that small, medium, and large wholesalers would have equal representation on the Board; so, too, would small and large depots. A wholesaler or a depot would not necessarily be in the same sub-class in successive years because of changes in the volume of milk sold.

The provisions in clause 90 relating to Co-operative Society dividends have been remodelled. A registered distributor may grant to his customers a dividend or discount at a rate not exceeding that paid for the same period by a Co-operative Society operating in the area.

Better Kippers

Efforts are being made to raise the general standard of kippering. Discussions have been taking place between the Ministry of Food, the H.I.B., and the Torry Research Station, near Aberdeen. The laying down of a standard for kippers was not easy, said Colonel J. J. Llewellin, Minister of Food. That was mainly owing to the variation in sizes and the fat content of the herring. However, he was hopeful that they would be able to get some kind of standard.

He said there had been a good deal of discussion about the dyeing of kippers. There was nothing harmful in dyeing, although it was sometimes used to disguise a low standard of kippering. "I have decided not to take any steps to prohibit the use of dye, but to try to tackle the quality matter from another point of view," he said. "We are going to try to raise the general standard of kippering."

He said he had therefore taken steps to prohibit the production of kippers from cured or pickled herring, and had appointed an additional Inspector of Kippering Establishments so that these might be inspected more frequently. That inspector would report on the quality of the product, on the methods of processing, and on the suitability of the premises and equipment. Warning would be given to those whose methods were not considered satisfactory, and if within a reasonable time satisfactory improvements were not made such establishments would be in danger of losing their licence for kippering.

Last year, said Colonel Llewellin, there had been a 37 per cent. increased production of kippers between May and August, and they were planning for a bigger fishing and more kippering next summer. He added: "If everything goes well, we are hoping to have the East Anglian herring season reopening next autumn for the first time since 1939."

Bactericidal Action of Vegetable Juices

Cato, the Roman, knowing nothing about bacteria or wound-healing substances, may not have been far wrong when he advised the application of mashed cabbage to bruised tissues. C. S. Pederson and P. Fisher (*New York State Agricultural Experiment Station Technical Bulletin* 273, 1944) show that certain bacteria, normally present on leafy vegetables, are rarely found in cabbage after fermentation begins, and that there are in cabbage some bactericidal constituents which cause a marked reduction in the number of gram-negative and some other bacteria within a few hours. The amount or activity of these substances varies with the variety of cabbage, and their action is inhibited by heating. The bactericidal material of onions differs from that of cabbage in that it is only partially inactivated by heating. In many other vegetables no appreciable anti-bacterial activity was found.

Variation in Flavour Judgments

A paper by H. D. Brown, M. K. Miller, and R. D. Schulkers (*Proc. Amer. Soc. Hort. Sci.*, Vol. 44, pp. 465-467) deals with the flavour indices of carrots, accorded by five judges who each tasted twenty-five carrots from one plot taken as a specimen for detailed recording. The interest here lies not in the effect of manuring upon flavour, but in the degrees of variation exhibited by the judges in tasting the produce of a plot treated as uniformly as possible. To use modern statistical language, the data provide material for testing taste variation both between judges and within judges. Considerable agreement is claimed from inspection of the results, though statistical analysis does not seem to have been applied. The scores allowed were from 1 (excellent) to 4 (poor). For this plot the average index for twenty-five carrots ranged from 2·16 (judge 3) to 2·68 (judges 2 and 4). Over the whole series of 300 carrots the average index ranged from 2·5 (judge 1) and 2·28 (judge 3) to 2·58 and 2·60 for judges 2 and 4. The authors say:

"The indices of all five judges are identical for six of the twenty-five carrots, and indices of the five judges did not deviate more than one degree for more than ten of the carrots. This places more dependence upon taste evaluations than is generally accredited to this elusive characteristic. From the table it is evident that judges 2 and 4 were severe in their judgment and that judges 1 and 3 were lenient. This relationship persisted throughout the entire testing period. Judges were able to taste seventy-five samples and still be able to detect differences in taste with the same apparent ease as at the start of the period. It was not deemed necessary to wash the mouth with distilled water after each taste test."

New Chlorine Dioxide Production Process

Development of a new process for production of chlorine dioxide, oxidising and bleaching agent, is described in *Chemical and Engineering News*. Chlorine dioxide is used for bleaching and maturing flour and bleaching starch, soap, paper and textiles, for improving taste in public water supplies, checking blue mould in citrus fruits, and helping preserve vegetables. Experiments indicate that sterilising the air with chlorine dioxide increases the yield of penicillin.

The new process, invented by W. S. Hutchinson and D. K. Meecham, of General Mills, Inc., and reduced to commercial practice by the Mathieson Alkali Works, Inc., is a process for dry production of the gas, through the reaction of chlorine and sodium chlorite. Its advantages over the wet systems of making the gas are less lag in obtaining a steady stream of chlorine dioxide and elimination of water, which is objectionable in some industrial operations and tends to cause corrosion and gumming in the chlorine system.

Equipment in the new process consists of two main parts, a generator with means for supplying chlorine and air, and a cabinet housing control, measuring and other apparatus. The generator consists essentially of two vertical towers, 4 inches in diameter and 3½ feet high. In operation the cylinders are filled almost to the top with flaked sodium chlorite; a mixture of chlorine and air is fed into the bottom of one of them. Chlorine dioxide, formed in the cylinder, is carried out at the top by the air current, goes into the bottom of the second cylinder, where any unreacted chlorine is oxidised, and passes out at the top into the distribution manifold, chlorine-free. When in about 100 hours of normal operation the chlorite in the first cylinder is fully exhausted, the second cylinder alone is used for generation while the first cylinder is being recharged. Then the flow of gases through the cylinders is reversed, and operation continues without interruption. Chlorine dioxide is so unstable that it cannot be produced in bulk and stored, but must be consumed immediately—that is, produced at the site of industrial use.

Amino-hydroxy Acids

A paper entitled "The behaviour of amino-hydroxy acids under conditions of acid hydrolysis of proteins," by M. M. Botvinik and E. A. Morozova, appeared in Vol. 41, pp. 70-74, of *Comptes Rendus (Doklady) Acad. Sci. U.R.S.S.*, 1943, which had just been received in Britain. The paper is in English. The authors state that in despite of recent progress in methods for total determination of amino-hydroxy acids their stability on heating with mineral acids remains an open question. They suggest that earlier authors have not paid sufficient attention to the matter of temperature.

The paper presents a substantial number of analyses of several important amino-β-hydroxy acids, including serine, casein, threonine, and valines, and a nor-leucine, treated at several temperatures between 120° and 165° C. with either 25 per cent. sulphuric acid or 36 per cent. hydrochloric acid; much of the data is new, and is compared with data already published. It appears evident that certain temperature conditions may increase the stability of amino-hydroxy acids upon hydrolysis. Contrary to expectation, hydroxy-asparagic acid was not decomposed upon heating with mineral acids, while hydroxyglutamic acid—in accordance with what was already known—readily decomposed in acid solution.

Preparations (described) of β-amino-α-hydroxy acids from solutions after heating with acids showed that these acids are stable under ordinary conditions of protein hydrolysis. The stability of amino-hydroxy acids on heating with mineral acids may, it is claimed, with some reservations, be considered as established for certain intervals of temperature. Amino-hydroxy acids having *iso* structure decompose more readily than nor-amino-hydroxy acids. Addition of carbohydrate (glucose or lævulose) or of casein had but an insignificant effect on the decomposition of amino-hydroxy acids: exceptions are presented by serine and β-hydroxyvaline, which showed decompositions as high as 7·6 and 20·5 per cent. respectively. Amino-β-hydroxy acid nitrogen has been estimated in casein and gelatine, the results agreeing with those reported in 1940 by Macara and Plimmer.

Determining Chlorophyll, Carotene, and Xanthophyll in Plants

A method for the determination of chlorophylls *a* and *b*, carotene and total xanthophyll from a single ether solution is described by R. B. Griffith and R. N. Jeffrey (*Industrial and Engineering Chemistry, Analytical Edition*, July, 1944). This method is adaptable to any spectrophotometer of good resolving power provided preparations are available for determination of absorption constants for the instrument to be used. The pigments are extracted from the plant material with acetone, transferred to ether, and chlorophyll is determined from the light absorption at the wave-lengths of the chlorophyll *a* and *b* maxima in the red end of the spectrum. Carotene and xanthophyll are separated in the unsaponified ether solution by means of the flowing chromatographic technique and then determined spectrophotometrically. Evidence is presented of the reproducibility of results which may be expected with this method. Single determinations seldom vary more than 5 per cent. from the average of four similar samples in the case of each pigment determined.

Ice Cream Manufacture

After more than two years, the ban on the manufacture of ice cream has been lifted. This article describes the many problems which accompany the resumption of the trade's activities, the main ones being concerned with ingredients, labour, packaging, transport, machinery and equipment.

CLIFFORD SKERTCHLY

THE revocation of the Ice Cream (Prohibition of Manufacture and Sales) Order on November 16 came as a swift surprise to many manufacturers, but to all who were intimately connected with the trade organisation the resumption of manufacture was expected at an early date.

The ban lasted nearly twenty-six months, and throughout that period the trade organisations, which held the view that their calling had been unjustly singled out for suppression, lost no opportunity of approaching the Ministry with a view to securing at least a partial resumption of business. On more than one occasion the Prohibition Amendment Committee had high hopes of success, only to suffer bitter disappointment. When the two trade organisations then in existence were replaced by the Ice Cream Alliance the Prohibition Amendment Committee continued its work.

For two years ice cream manufacturers accepted with calm resignation the ban on their right to earn their livelihood on equal terms with other food manufacturers and traders. During that period many of them had suffered severe losses, while their plant and equipment had deteriorated through enforced idleness. Very little of the trade's machinery and cold storage space had been taken over for Government use; practically the whole of the plant had been registered as scrap metal.

A Grand Offensive

In view of the changed war situation ice cream manufacturers began to *demand* the revocation of the Prohibition Order and to claim *as a right* to be allowed to do business equally with other manufacturers and traders. Strong resolutions of protest against the continuance of the ban were passed at divisional and branch meetings of the Alliance up and down the country. The Prohibition Amendment Committee called the attention of the Minister to the fact that former employees in the ice cream industry were returning from the Services only to find that the Reinstatement in Civil Employment Act was not worth the paper on which it was printed because the Prohibition Order debarred these men from returning to their former jobs. The Milk Bars Association also joined in the "grand offensive," which has now been crowned by victory.

In addition to ice cream manufacturers, several other food industries, including manufacturers of biscuits, flavouring essences, margarine, stabilisers, ice cream powders, sugar and so on will benefit by the removal of the ban. All these industries have reason to be specially grateful to three men—Mr. F. F. Farage, of Messrs. Cumming, Parsons, Ltd. (chairman of the Prohibition Amendment Committee); Mr. A. Facchino, of Messrs. Facchino's Purity Biscuits, Ltd. (vice-chairman of the Council of the Ice Cream Alliance); and Mr. P. K. MacKenzie (secretary of the Ice Cream Alliance).

Although the manufacture of ice cream has been legal since November 16, little ice cream has yet been marketed. The first allocation of ingredients was made when the new ration period began on December 10, but even then the resumption of manufacture was far from universal. Mr. W. Mabane, Parliamentary Secretary to the Ministry of Food, spoke truly in the House of Commons when he said that the restoration of the industry would be gradual and must necessarily take some time.

Those manufacturers who are able to resume manufacture are making better ice cream than at any time since the use of any form of milk was prohibited on April 1, 1941. Wheat flour mixes are a thing of the past. The new mixes, in a number of instances, bear comparison in food value with those marketed before the war. Where, however, a firm aims at maintaining its pre-war gallonage some sacrifice of food value is usually essential.

Before the war the majority of manufacturers used

Mr. Curtis celebrates the lifting of the ban by dispensing free ices to the children.

unsalted butter as their source of fat; others used a 100 per cent. vegetable fat; some—rather more than was generally known—used cream; and a few used margarine. The only fats that the Ministry can now allocate are margarine and its constituent oils such as palm kernel or groundnut oils.

Allocations of Fat

Allocations of fat are being made only to ice cream manufacturers who can show that they used butter, margarine, cream or vegetable fat in their mixes during the datum period (1938-39). These firms are allocated approximately 80 per cent. of the quantity they used in the datum period. Thus, for every 100 lb. of butter a manufacturer used in the datum period he will receive approximately 80 lb. of margarine or its equivalent weight in 100 per cent. vegetable fat. The allocation varies in different parts of the country so as to account for changes in population in different areas since the outbreak of war. The average allocation over the country as a whole is 80 per cent.

Ice cream manufacturers who, in the datum period, used liquid milk as their only source of fat, and made no purchase of butter, margarine, cream or vegetable fat do not *at present* receive an allocation of fat. This is largely due to difficulties of administration and distribution, but there is reason to hope that these problems will ultimately be solved.

Milk Powder

Roller process skim milk powder is being allocated on a " ton for ton " basis with fat to those entitled to a fat allocation. Apart from a limited release of evaporated milk in the summer of 1942, this is the first milk allowed for ice cream manufacture since the use of milk (Restriction) Order came into force in April, 1941. That Order is still in operation, but a general licence has been issued by the Ministry to authorise the use of this roller process S.M.P. in ice cream.

In normal circumstances manufacturers use spray process skim milk powder in preference to the roller process product, as the latter is said to impart a " cooked " flavour to ice cream. Under war conditions, however, both manufacturers and the public gladly accept the roller type. The cooked flavour " tells " the public that they *are* receiving a nutritious milk product, just as the use of evaporated milk did for a brief period in 1942.

Allocation of the skim milk powder presents a difficulty, as it is available only in barrels of 225 lb. It is released by the Ministry's agents in that form, and its issue to the smaller manufacturers who are entitled to less than 225 lb. in the eight-week ration period presents a problem. The Ice Cream Alliance has offered to undertake the responsibility for breaking down these bulk supplies and allocating the authorised quantities to small users irrespective of whether they are members of the Alliance or not. No decision has yet been reached on this proposal.

Ice cream manufacturers who do not receive the fat allocation do not at present receive an allocation of skim milk powder. As fat and milk solids are essential ingredients of ice cream the Ministry's decision means that a large number of firms, particularly caterers and small manufacturers, are still being kept compulsorily out of production.

Many caterers who in the datum period based their mix on liquid milk without additional fat are unable to resume manufacture because of the Use of Milk (Restriction) Order which forbids the use of liquid milk, milk powder and condensed milk in ice cream. Caterers receive condensed milk and milk powder for use in connection with their catering businesses, but these supplies must not be used for ice cream manufacture. The general licence (S.R.O. 1281) issued on November 16 under that Order permits the use in ice cream only of skim milk released specifically for that purpose, and these caterers receive no allocation of either fat or skim milk powder for use in ice cream. The Ice Cream Alliance has made a strong protest to the Ministry against the method of making allocations, and has asked that the allocation of skim milk powder should be linked with the sugar datum usage, and not with fat. Discussions are still proceeding on this suggestion.

Some months before the ban on manufacture was revoked the Ministry promised that the first intimation of any change in the ban would be given to the trade organisation. When, however, the Ministry decided to lift the ban that promise was not fulfilled because the Ministry felt that to have done so would have given an unfair advantage to the small number of ice cream manufacturers on the Council of the Alliance. The first intimation was therefore given in Parliament. In allocating ingredients to the industry, however, the Ministry has adopted a system that, in general, gives an advantage to the larger manufacturers over the smaller ones.

The Sugar Allocation

The sugar allocation has been fixed at 60 per cent. of the datum usage and has been granted to all manufacturers. To a number of firms it is feared, however, that in the absence of any fat or skim milk powder an allocation of sugar is of little use, especially as it is illegal to use it otherwise than for the purpose for which it is issued. The position of these less fortunate firms will depend largely on the extent to which cornflour, soya flour and ice cream powder are available to them.

Only a small quantity of cornflour is available, and no allocation can be made to ice cream manufacturers on the basis of datum usage. The position in regard to soya flour is much easier, though much of the supply is of low oil content. In any case a product containing no milk and having soya flour as its only source of fat cannot hope to compete with a real ice cream.

Fortunately the position in regard to ice cream powders is more satisfactory. Allocations of ingredients based on datum usages are being granted. These supplies include both skim milk powder and sugar to manufacturers of ice cream powder who previously used them.

The position as a whole in regard to ice cream powders is still uncertain and rather obscure. One well-known firm, however, has placed on the market a complete powdered ice cream mix. It is sweetened and contains a percentage of fat. Such products, if available in quantity, will prove a boon to the small ice cream maker.

The use of gelatine, the most popular stabiliser for ice cream mixes, is permitted. Some of the other stabilisers frequently used before the war are practically unobtainable. Difficulty may be experienced at times in regard to gelatine.

Supplies of flavourings are sufficient to meet the needs of the trade, though the range is limited. Vanilla, strawberry, lime, raspberry, pineapple, coffee and chocolate are available. Nearly all of them are bolstered up to some extent. They contain a small percentage of genuine extract and the remainder is synthetic. The reason for this is that supplies of genuine vanilla bean extract and of real fruit juices are short. Flavouring essence manufacturers are rationed in common with other users of raw materials.

Ice Cream Mixes

Ice cream manufacturers who have allocations of fat, skim milk powder and sugar should be able to produce a mix containing approximately 10 per cent. of each of fat, sugar and skim milk powder. When flavouring and stabiliser are added the total solids content would exceed 30 per cent., which can be regarded as a satisfactory product under war conditions. The fat and milk-solids-not-fat contents do not differ very widely from those of the average pre-war reconstituted mix.

The sugar content, however, compares with a pre-war average of about 13·5 per cent. The reduction means, of course, a loss of solids compared with the pre-war mix. Under war conditions, however, the public have become so accustomed to having their foods less sweet than before—sometimes without any sweetening at all—that a 10 per cent. sugar content is very favourably received.

One reason why the Ministry of Food was desirous of putting ice cream on the *menu* again was in order to provide a change of diet for the public. Most people take less sugar as they grow older. The new ice cream, being less sweet than the pre-war product, may therefore be more acceptable to the middle-aged and the elderly. Sweets are now consumed by everybody, whereas they were formerly to a large extent the monopoly of the children. The same may be true of ice cream in 1945.

Cream essences are attracting the attention of ice cream manufacturers who normally do not use them. Their object is to impart to their products a creaminess that seems to be lacking in the absence of milk fat. Fortunately supplies of these essences are reasonably good, and most manufacturers of them are able to supply new customers as well as old.

Getting into Production

The way back to normal production and marketing is still a tortuous one even for firms that have received allocations of ingredients. Deterioration of machinery and equipment during the period of enforced idleness has been, on average, possibly double the normal rate. For two years prior to the ban on manufacture great difficulty had been experienced in obtaining repairs and renewals. Some firms have had more than £1,000 worth of machinery standing idle ever since the use of milk in ice cream was prohibited three and a half years ago.

Since the ban on manufacture has been lifted many manufacturers have found that their machinery is no longer in working order. Scraper blades refuse to rotate in the freezers; refrigeration plants refuse to function; and so on. A good deal of plant that was badly in need of an overhaul in 1942 will probably never see service again. It is practically impossible at the present time to obtain new freezers, storage cabinets, emulsifiers, and other articles of equipment. Most of the machinery used by the ice cream trade before the war was of overseas origin and importation under present circumstances seems to be out of the question.

Some firms have kept their plant in surprisingly good condition during the period of stagnation, and these firms, who include a number of the best manufacturers, are able to resume business within limits. In some cases the author has seen costly plant gradually deteriorating for want of regreasing or through being stored in a damp place, but there was nobody to attend to it.

Even where the machinery and plant are in working order the larger firms are faced with difficulties in regard to labour and transport.

Labour Problems

Manufacturers are obliged to rely on such labour as the Employment Exchanges will allow. No priority or preference of any description is allowed. It is therefore expected that whatever labour manufacturers may be able to procure will be of doubtful quality and totally inexperienced. The men will have to be trained for their new jobs. The number of former employees returning from the forces is very limited, and even in these cases the Ministry of Labour has power to employ them on other work of greater national importance, and in these cases the men's rights under the Reinstatement in Civil Employment Act are held in abeyance.

A matter of supreme importance to all manufacturers who employ labour in other branches of their undertaking is that they must on no account divert to ice cream production any of that labour that is safeguarded or directed in any way. This is a point to which the Ministry of Food and the Ministry of Labour attach the utmost importance. On the other hand there is nothing to prevent a manufacturer from transferring to the ice cream section of his business men and women who are not engaged on essential work, or who have not been directed to the tasks on which they are at present engaged. Subject to those provisos, a manufacturer may make whatever adjustments of his staff seem to him to be in the best interests of his business. Most of the ice cream industry's scientists and research workers are still engaged on work of national importance, and are not available to resume their civil occupations. This means that some of the larger firms may have to surmount wartime technical problems with the aid of very limited technical staff.

Transport Difficulties

Transport also presents difficulties to a number of wholesale manufacturers. There is no actual restriction on the use of rail or road transport, but the Ministry of Food has given instructions that economy *must* be observed. Allocations of petrol are being made on

the basis of mileage, but manufacturers have been warned that any abuse of petrol or tyres may result in the petrol allowance being reduced.

Before the ban on ice cream manufacture was imposed, Lord Woolton, then Minister of Food, called attention to the containers used by the ice cream trade for rail transport purposes. He emphasised that the weight of the containers exceeded that of their contents, and that the weight of the returning " empties " was more than 50 per cent. of the laden weight. He also stressed the fact that there was considerable cross-haulage of traffic that was not in the national interest under war conditions.

Decentralisation of Production

The national manufacturers, however, had decentralised production. They were making ice cream in London, Birmingham, Lancashire (or Cheshire), Glasgow and Aberdeen, instead of in London only. Transport of ice cream had therefore been substantially reduced. The extent to which the decentralisation of manufacture will be possible in connection with the resumption of manufacture will depend very largely on the labour that the Government Departments concerned are prepared to allow. In any case the number of containers travelling to and fro will be very much lower than that normally in use. At the outbreak of war wholesale manufacturers had several thousands of them in use. Since then replacements have been difficult to obtain, and it is doubtful whether any new ones will be obtainable before the end of the war in Europe. During the period of hostilities numbers of containers have become unfit for further service, and many more have been utilised for other purposes. The number still available for ice cream is therefore only a fraction of the pre-war total.

Paper for packaging purposes is an important matter to wholesale manufacturers, but at the time of writing nothing definite is known about any allocation of wrapping paper or carton material that the Paper Control may be able to grant for ice cream.

The Ministry of Food seem to have revoked the Prohibition Order without prior consultation with some of the Departments concerned. The announcement in the House of Commons was the first intimation that some divisions of the Ministry of Food had on the matter.

Quality Standards

One of the largest manufacturers in the country informed the author that his firm are putting on the market a product fully up to their pre-war standard of food value. This means that quality will be maintained by sacrificing gallonage. They were able to begin production in a very small way by the end of November, but although they have received their full allocation of ingredients from December 10 onwards they do not expect to resume large-scale production before this month (January). The experience of this firm in getting back into production is typical of that of the majority of the larger firms.

Some ice cream manufacturers have been asked by their Divisional Food Office whether they hold a licence to manufacture ice cream. In point of fact no licence is required, but no firm will be able to resume manufacture unless they can prove that they were producing ice cream in the datum period. No firm can yet begin manufacture for the first time.

Licensing of Manufacturers

The Ministry of Food will issue a statement shortly dealing with the licensing of ice cream manufacturers. Until the statement is made it is impossible to say what the Ministry has in mind. Every ice cream manufacturer's premises are already registered with the local authority, but it is believed in the trade that the Ministry may wish to possess a complete list of all manufacturers and may require them to apply for a licence mainly for this purpose. A licensing system might also give the Ministry a fuller measure of control over the industry, as the Minister could then revoke the licence of any manufacturer who might seriously contravene the regulations in force at any time.

Most people enjoy their ice cream all the more if it is accompanied by a wafer biscuit. The resumption of ice cream manufacture has, of course, made a large increase in the demand for wafers and cones. Biscuit manufacturers are negotiating with the Ministry with a view to being allowed to increase their output. The matter concerns man-power as well as ingredients, and it may therefore not be an easy matter to accede to the trade's request.

Thus from every point of view the task of getting back into business must of necessity take time, but it is gratifying to note that Mr. Mabane, in his statement in the Commons, expressed the hope of a substantial improvement in the position during 1945.

The Future of Bakery Craft

A HANDY little booklet* on bakery craft gives new recipes and methods to meet war-time conditions as they affect the products of the baker and pastrycook and, in a lesser degree, the caterer.

The author is at pains to make clear that he has not undergone any " change of heart " in his conception of what should constitute the real aims and objects of the modern craftsman. He points out that he has stood steadfastly for the policy that only the best commodities available should be used in the production of confections to be served to the public. He explains that his " conversion " is solely due to the complete reversal of conditions arising out of the world conflict.

It is impossible to adhere to the old methods, and new and revolutionary ones have had to be found. This could only be done by breaking away from tradition and by discovering by experimental research, both scientific and empirical, how best to effect the objects desired. The recipes and methods given in this book are the result.

The book is divided into ten sections: Fermented Goods, Fermentation with Aeration, Dough and Lardy Cakes, Counter Goods, Slab and 4-lb. Long Cakes, Jams as Sugar Content, Breads and Rolls, Baked Custard, Recipes and Method, Table of Flavourings.

A small book, chock-full of expert advice.

T. C.-W.

* *Bakery Craft in War-Time and Afterwards.* By George E. Hoare. Pp. 66. London. 4s. 6d. net.

Air-Conditioned Kippers

The recent experiments in the smoking and curing of fish, which have been carried out at the Torry Research Station for some years past and which were described in the October 1944 issue of FOOD MANUFACTURE, have been put into practice in a plant planned on a small commercial scale working in Glasgow. The main item of the new plant is the air-conditioned kiln, which is described in this article.

SPECIALLY CONTRIBUTED

AIR-CONDITIONED kippers, produced at more than twice the rate possible by traditional methods and controlled mechanically through every stage of processing, will soon take their place on British breakfast tables.

The principle of the new method is to use forced, instead of natural, ventilation; by the latter method smoke permeates upwards through tiers of fish, and involves several disadvantages, among which is the necessity for a constant watch on the operations of the kiln, as the fish on the tiers are all at different stages of curing, those at the bottom being more advanced than those at the top.

The new type of kiln was designed and manufactured by Airscrew, Ltd., based on the recent developments at the Torry Research Station, Aberdeen.

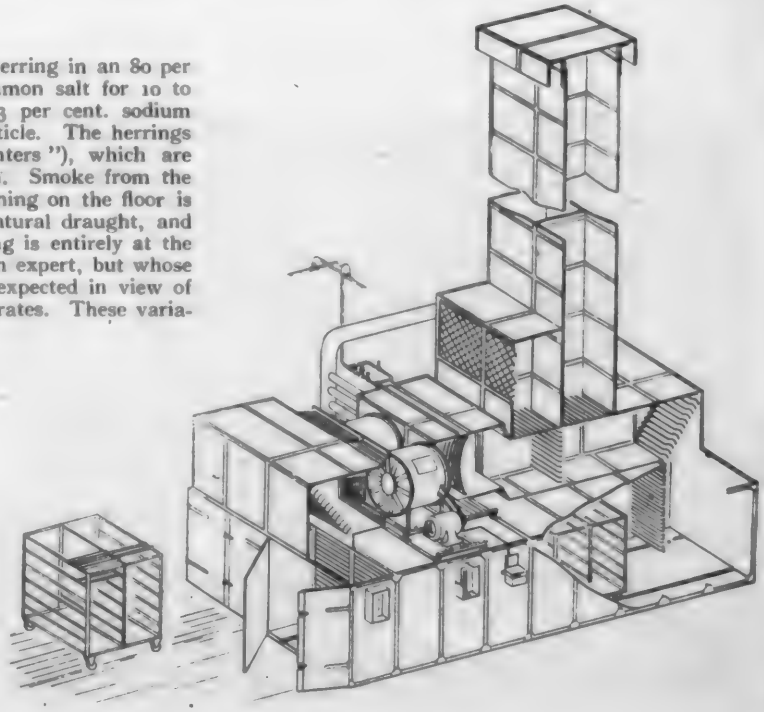
Kippering as a mode of preservation depends on the combination of drying and smoking, the two being about equal in importance.

The Old Process

A typical procedure is to brine herring in an 80 per cent. to saturated solution of common salt for 10 to 20 minutes, resulting in a 2 to 3 per cent. sodium chloride content in the finished article. The herrings are then hooked on sticks ("tenters"), which are fitted in tiers into a tall brick kiln. Smoke from the fire of oak chips and sawdust burning on the floor is carried up amongst the fish by natural draught, and the period and intensity of smoking is entirely at the discretion of the smoker, who is an expert, but whose product is variable—as might be expected in view of the conditions under which he operates. These variations have made it evident that a scientifically controlled kippering process might be substituted with advantage. Work on experimental controlled kilns was therefore carried on as part of the programme of the Food Investigation Board. The first kiln designed still stands in the Torry Research Station.

A further step has been taken in the erection of a larger kiln in Glasgow by the old-established kippering firm of James M. Davidson which turns out about nine tons of kippers per ten-hour day, a great improvement on the old system which takes twenty-four hours to turn out the same amount. Apart from this advantage, running costs are lower and the finished product has a much better flavour than that formerly produced. Handling of the fish is reduced to a minimum, thereby promoting better hygienic conditions to the advantage of the product.

The kiln is constructed on a prefabricated basis,



Isometric view of the Airscrew Fish Kiln, showing flow direction of air and smoke.

Four Airscrew Fish Curing and Drying Kilns occupying an area of 650 sq. ft. and giving an approximate output of 144 crans per 24 hours.

can be easily erected without dislocating existing production methods, and occupies only a fraction of the space used by present facilities giving the same output.

The walls and ducting are made of a new insulating material about 1 inch thick, having thermal properties equal to an 18-inch brick wall. The heating battery regulating the dry bulb temperature is automatically controlled. Smoke is supplied by an independent producer and thoroughly mixed with fresh and recirculated air.

The Design of the Kiln

The design of the kiln is on the counter flow principle—*i.e.*, the material travels against the air flow. By this method the wet material is introduced into the kiln at a point where the dry bulb temperature is at its lowest value, and the relative humidity at its highest. The product travels along the kiln, either by hand or mechanical means: thus in the last stage it is in contact with the air at its highest dry bulb temperature and lowest relative humidity. The change of conditions from end to end is gradual.

The operation and resulting production is in a continuous and progressive form.

The same apparatus can be used for smoking, drying, curing, dehydrating or thawing commodities, the only difference between any of these functions being the adjustment of suitable psychometric conditions. All the operations can be performed in the same unit, consecutively in one combined cycle.

The air is discharged by equally spaced distributing louvres, in such a manner as to give a uniform air flow in the width and height of the kiln but varying in depth.

The air volume is calculated for the actual amount of moisture to be evaporated from the product in a given time. According to the product or kind of treatment, the air velocity may vary from 1 ft. per second to 15 or 20 ft. per second.

Relative humidity is controlled, and obtained, by the adjustment of fresh air, exhaust air and recirculating air sectional damper louvres, all operated simultaneously by one manipulation. These damper louvres are so constructed that they can be set independently in any desired position between fully open and fully closed. They are mechanically interlocked to facilitate control from one point.

The circuit resistances are so balanced as to allow the air to escape through the exhaust shaft when the sectional damper louvre is set for discharging to the atmosphere.

The Counter Flow System

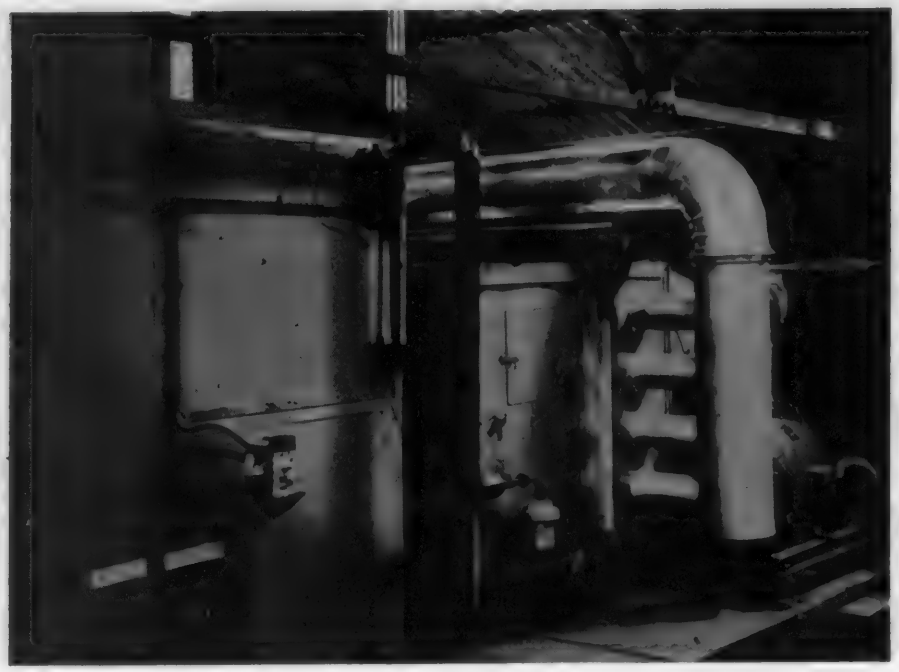
The basic principle of the counter flow system is to obtain a temperature and relative humidity variation from end to end of the tunnel. In this particular unit, the dry bulb temperature drops by 4° to 8° F., and the relative humidity increases over the same length by 8 to 12 per cent. The actual variations are mostly due to the heat absorbed and moisture removed from the product under treatment, apart from the actual losses, either through the constructional material or infiltration, due to opening the unit.

The heating coil is usually located on the suction side of the circulating fan. For drying, curing or smoking, the operating dry bulb temperature ranges from about 70° F. to 120° F. measured on the discharge side of the unit. When used for dehydration, the temperature range can be set to control the discharge air temperature as high as 220° F. if necessary.

In the United Kingdom and where similar climatic conditions prevail, an automatic control is provided to

Heater Controls for automatic or hand operation.

Arrangement of heaters, mixing chambers, and axial flow fans for twin tunnels.



Smoke supply ducts to mixing chamber. Fresh air inlet and steam connections to heater.

revert to full fresh air operation above a dew point of, say, 62° F. so as to ensure an equivalent rate of treatment for the commodity.

For application under different climatic conditions, the dew point value will be selected to ensure uniform treatment and maximum economy in operation.

The circulating fans are controlled by either the loading or unloading doors; that is, they are set in motion by the closing of the doors and automatically switched off when the pressure is released from the door. The mechanism consists of electrically controlled contacts.

Inspection windows are incorporated in the structure and can be used for locating hygrometers.

Use of Smoke

Fresh and recirculated air is mixed to the required conditions before the heating coil. Smoke is produced independently and discharged into the air stream after the heating coil by means of suction created by the circulating fan. The fan is of the axial flow type and discharges the mixture of air and smoke through a series of turning vanes into an expansion chamber located before the distributing louvres. The mixture travels across the material after being discharged by the distributing louvres, to be collected on the other side of the tunnel through the return air louvre.

The three-way sectional damper regulates the amount of air to be recirculated, discharged or drawn into the system. In this particular case the heater is supplied with steam and is automatically controlled.

The new system constitutes a great advance on previous methods of kippering. Herring which arrive for kippering in the morning can be cured, packed, and ready for dispatch the same day and can be on the market the following morning.

The applications of the kiln are not confined merely to fish—meat, bacon, ham, etc., can be smoked, dried or dehydrated.

* * *

The author is indebted to the Airscrew Co., Ltd., for the provision of the technical details of the kiln and for the illustrations in this article.

ACKNOWLEDGMENT

The Factory Canteen

THE author of *The Factory Canteen*, published in the November, 1944, issue of FOOD MANUFACTURE, wishes to make acknowledgment to Mr. J. H. Polfrey, to whom he is indebted for the sections in the article under sub-headings, "Buying for the Canteen," "Estimating Turnover," "Costing," and "The Percentage System," which were taken from an article by Mr. Polfrey, published in *The Caterer and Hotel Keeper*.

BOOKS RECEIVED

Nutrition and National Health. By Sir Robert McCarrison, C.I.E., M.D., D.Sc., LL.D., F.R.C.P.

Vegetables for Victory. By Ambrose Heath.

Medical Care for Citizens. P. E. P. Pamphlet.

The Bakery Trade as a Career. By Albert R. Daniel.

Spice Contamination and its Control

J. YESAIR AND O. B. WILLIAMS

National Canners Association, Research Laboratories, Washington, D.C.

The investigation of spice contamination was undertaken by the Research Laboratory of the National Canners Association as part of a general programme to study contamination of ingredients used in canning.

THE stimulus for this work came out of a report by Jessen, Wood, and Jansen (1934), which focused attention in a very practical manner upon the commercial effect of spice contamination. They found that spore-forming organisms present in a spice mixture containing coriander and white pepper were responsible for swelling in canned chopped hams. Later Jensen (1937) reported that sage and other spice ingredients used in pork sausage were found to contain sufficient bacteria to cause the product to deteriorate rapidly. It was desirable, therefore, to determine whether other spices carried the well-defined spore-forming spoilage types as well as other organisms which might be significant in the spoilage of particular products.

Observations were made at one spice-manufacturing plant of the method of preparing spice with specific reference to means of reducing bacterial numbers. The procedure consisted of the removal of gross foreign material, such as pieces of wood, iron from broken implements, etc., with screens. This was followed by the removal of as much dust and dirt as possible by means of blowers. The spices were then ground and blown through a series of cloth tubes primarily used as screens and not as instruments for removing bacteria. In order to judge the effectiveness of the cleaning treatment at this plant a sample of pepper cleanings and one of the finished product were obtained and tested for their bacterial content. The pepper cleanings had a count of 55,000,000 bacteria per gram while the finished spice had 2,000,000 bacteria per gram. Thus an enormous number of bacteria was removed by the cleaning process used at this plant.

Extent and Degree of Spice Contamination

Forty different spices and herbs were obtained from packers and canners. Most of the samples were in a ground state, but some—for example, bay leaf—were in the "whole form."

For whole spices, such as allspice and cloves, a 10-gram sample was used. Where the spices or herbs were of a bulky nature a 2-gram sample was employed, and in the case of ground spices a 1-gram sample was used. The weighed sample of spice or herb was placed in a flask with 100 c.c. of sterile water and shaken vigorously for 5 minutes in order to suspend the bacteria. Appropriate dilutions of the prepared suspensions were pipetted into various media.

For the total bacterial counts of unheated spice suspensions, cultures were made in Difco brom cresol purple (B.C.P.) tryptone dextrose agar. Incubation was at 37° C. (98·6° F.) for 48 hours. For the detection of acid-tolerant bacteria and for moulds, wort agar cultures were prepared and incubated at room temperature for 5 days. After boiling for 5 minutes the suspensions were cultured for spores in B.C.P. tryptone dextrose agar. These cultures were incubated at 37° C. and 55° C. (131° F.) for 48 hours. For the detection of spores of aerobic gas-producing bacteria, cultures were prepared in the medium of Jensen *et al.* (1934) and incubated at 37° C. for 5 days. Many of the heated spice suspensions also were cultured for thermophilic anaerobic bacteria (not producing H_2S) using liver broth medium—Cameron (1936)—and for sulphide-spoilage bacteria (thermophilic anaerobes producing H_2S) using sulphide medium—Cameron (1938). All cultures were incubated at 55° C. for 48 hours. Finally to detect the presence of putrefactive anaerobic spores, cultures were prepared in liver broth medium and incubated at 37° C. for 5 days.

Variations in Bacterial Counts

In general, the results showed marked variations in the bacterial counts of similar spices. Black pepper was the spice most heavily contaminated. Total counts for seven samples ranged from 1,200,000 to 16,300,000 per gram. Counts for moulds acid-tolerant bacteria and mesophilic aerobic types were correspondingly high, while counts for thermophilic aerobic spores were relatively low. Putrefactive anaerobes were not encountered in any of the 116 samples examined for these types. Spices like the peppers, coriander, and marjoram varied widely in the counts of the aerobic spore-forming organisms producing gas in Jensen's medium. Cloves, whole or ground, with a maximum count of 12,000 organisms per gram, were the least contaminated of all the important spices tested.

Commercial Requirements

From the results recorded above it would appear that practical handling of the problem of bacterial contamination of spices depends upon sterilisation, since it does not appear likely that untreated spice of low bacterial content can be prepared readily. Complete sterilisation is not a usual commercial requirement for spices any more than for starch, flour, or other ingredients, but there is a need for treatment which would result in considerably lower bacterial counts. The wide variation in counts for different samples of similar spices suggests that some measure of control might be applied in maintaining a proper bacterial condition in spices from the time of their preparation until

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their use. This, however, would depend upon improvement in the established food-handling customs of spice-exporting countries and nothing has come to attention that would suggest an attitude that is promising in this respect. On the contrary it would appear that manufacturers in this country must develop and apply their own control measures.

Sterilisation Methods

Black pepper was chosen as the principal test spice for study of sterilisation methods both because of its extensive use and because of its high contamination. The various treatments that were applied, and their effect, are discussed individually.

Sterilisation by heat would offer a relatively simple solution to the problem of contamination if it could be carried out with little or no reduction in the potency of the spice, and without modification of its flavour. Experiments were therefore conducted to determine the effect of heat on bacterial count and on potency and flavour.

A preliminary series of range-finding experiments was made in which samples of pepper were autoclaved in test tubes, sealed and unsealed. In the first experiment the spice carried contamination of appreciable resistance, and there was a limited survival even after treatment of 20 minutes at 115° C. (239° F.). Specifically, the reduction accomplished was from 13,000,000 to 200 bacteria per gram. This reduction was much greater than would be necessary for acceptable commercial quality.

Moist Heat Effective

In another test black pepper was spread in a large porcelain pan to a depth of about ½ inch. The pan was covered with brown paper and autoclaved at 15 pounds pressure at 121° C. (250° F.) for 15 minutes. Following this the spice was dried at 35° C. (95° F.) for 20 hours. The reduction in number of bacteria by this treatment was from 83,000,000 to about 1 per gram. This lot was subjected to a potency test in four laboratories connected with the meat-packing industry. Methods of assay varied somewhat, but the preferred method consisted of mixing the test samples with ground beef, cooking the mixture, and finally judging the flavour. Consensus of opinion was that the unheated sample was approximately 10 per cent. stronger in flavour and odour.

Concluding experiments were made in which spice samples were heated for 5-, 10-, and 15-minute intervals at 5, 10 and 15 pounds of steam pressure. Original counts at 37° C. (98·6° F.) were 26,000,000 vegetative cells and 750,000 spores per gram. The lot receiving the lightest heat treatment, 5 minutes at 5 pounds pressure, gave a count of 1,300 vegetative cells and 100 spores per gram. Other lots were practically sterile. Potency tests of spices heated at 15 pounds pressure for 15 minutes indicated flavour destruction amounting to about 10 per cent.

These results show that moist heat is an effective means of sterilising black pepper. There is evidence that the spice contamination will vary in its resistance, but it appears that a relatively mild treatment is effective in reducing contamination to a low level. The economic disadvantage resulting from a loss of 10 per cent. potency will probably be more than compensated for by spoilage reduction.

Use of Ethylene Oxide

Cotton and Roark (1928) were the first to report the use of ethylene oxide as a fumigant. They stated that insects buried in overstuffed furniture, sealed in packages of cereals, or present in jars of rice were killed with ease. No deleterious effect was noticeable when foodstuffs, such as nut meats and dried fruits, were treated. Cotton and Young (1929) found that by mixing carbon dioxide with ethylene oxide the toxicity was considerably increased and the fire hazard was reduced. Gross and Dixon (1937) patented a method for sterilising foodstuffs, soil, etc., by means of ethylene oxide used at room temperature. It was also found to be effective in destroying pure cultures of various types of bacteria, among which were anaerobic types such as *Clostridium botulinum*. Griffith and Hall (1938) patented a method for sterilising dry food materials by using ethylene oxide at an elevated temperature and *in vacuo*.

TABLE 1

EFFECT OF ETHYLENE OXIDE ON BACTERIAL CONTENT OF SPICES

No.	Material.	Counts per Gram of Spice.	
		Total (Vegetable Cells and Spores).	Spores.
1	Top ½ inch layer of pepper	380	Less than 20
2	Bottom ½ inch layer of pepper	1,480	Less than 20
	Control (pepper) ..	16,000,000	48,000
3	Top ½ inch layer of cinnamon	20	Less than 20
4	Bottom ½ inch layer of cinnamon	50	Less than 20
	Control (cinnamon) ..	36,400	1,0000

Technique of Treatment

The effect of ethylene oxide treatment on the bacteria present in spice was studied in several ways. In a preliminary series of experiments 5-gram lots of black papper were weighed into 300 c.c. Erlenmeyer flasks. In some tests ethylene oxide 0·7 c.c. was applied in direct contact with the spice. In others the agent was dropped into a small tube suspended within the flask above the spice. Some of the flasks had been evacuated prior to the addition of the agent. Flasks were exposed for 24 hours at room temperature, at 37° C (98·6° F.), and at 50° C. (122° F.). The total bacterial counts and spore counts indicated that the agent was most effective under vacuum in direct contact with the spice and at the higher temperature of exposure; for example, before treatment one pepper sample had a total count of 16,000,000 and a spore count of 48,000 per gram. After exposure of the spice away from the agent *in vacuo* at 50° C. for 24 hours, the total count was reduced to 480 per gram. With the agent directly in contact with the spice *in vacuo*, the total count was reduced to 90 per gram. The spore count in each case was less than 20 per gram of spice.

Black pepper and cinnamon in 100-gram lots were placed in pint Mason jars with the covers loosely

fitted, and exposed to ethylene oxide in a 3-gallon aluminium vacuum kettle. The kettle was placed in a water bath at a temperature of approximately 85° C. (185° F.) and evacuated to 27 inches. Then 15 c.c. of ethylene oxide were admitted. This resulted in a reduction of the vacuum to 23 inches. The kettle was kept at approximately 80° C. (176° F.) for 5 hours, during which time the vacuum dropped to 18 inches. After this time the kettle was aerated with filtered air for 20 minutes.

In order to determine whether the ethylene oxide had reached the spices in the bottom of the jars, a 5-gram sample of each spice from the top layer and the bottom layer was used for bacterial counts. The results of cultures incubated at 37° C. (98·6° F.) for 48 hours (Table 2) indicate that after the ethylene oxide treatment the spices approached sterility even at the bottom of the jars.

Tests were made for residual oxide by using freshly treated black pepper and some black pepper which had been sterilised by heat. Both pepper samples were inoculated with aerobic spores and then were stored overnight in tightly stoppered tubes. Tests made on suspensions of each sample gave approximately the same counts, indicating that there was no residual ethylene oxide in the freshly treated spice.

TABLE 2

No:	*Treatment.*	*Per Cent. Spore Reduction.*
1	1 c.c. ethylene glycol added to 100 c.c. liver broth spore suspension, shaken 30 minutes	26
2	1 c.c. ethylene oxide added to 100 c.c. liver broth spore suspension, shaken 30 minutes	100
3	1 c.c. ethylene oxide added to 100 c.c. liver broth, then boiled 5 minutes, cooled, and inoculated with spore suspension, shaken 30 minutes ..	22

Effect of Ethylene Oxide on Dried Spores

A series of tests was made to determine the difference in degree of the destructive action of ethylene oxide upon aerobic spores which had been dried on sand, a non-absorbing material, and on spores which had been dried in starch, an absorbing material. The starch used in this series of tests was considered analogous to finely ground spice. The samples of sand and starch were placed in loosely capped jars and were treated with 15 c.c. of ethylene oxide in a dry condition as in the previous experiment. The vacuum ranged from 28 inches at the start to approximately 14 inches after 5 hours, and the temperature of the water bath varied from 80° to 86° C. (176 to 186·8° F.). Total counts of the materials after the treatment showed 94·9 per cent. reduction on the sand and 99·6 per cent. reduction in the starch.

Another test was made in which the sand and starch containing the aerobic spores were treated with ethylene oxide in a vacuum kettle in which was placed a beaker of water to supply moisture. The total counts made after the treatment showed the materials to be sterile. It was concluded from these tests that ethylene oxide was more effective when used in a moist condition than in a dry condition. Spices would carry enough moisture to satisfy such a condition.

It was considered desirable to compare the effectiveness of ethylene oxide with ethylene glycol which, according to Cotton and Roark (1928), is formed when ethylene oxide is heated in the presence of water. Flasks were set up according to the following protocol, which gives also the percentage reduction of spores.

It is obvious from these results that ethylene oxide is a much more effective bactericidal agent than ethylene glycol.

Formaldehyde

Formaldehyde was used as a matter of incidental investigation because of its recognised germicidal properties; however, its acceptability in commercial practice is not a subject of comment in this paper. Several tests were made in vacuum and at atmospheric pressure with black pepper. Reduction in total count from 16,000,000 to 600 per gram was obtained. To what extent this was due to actual destruction was not established, however, because other experiments indicated that failure of growth in plate cultures may have been due to inhibition induced by the reagent. The bacteriostatic property of formaldehyde is of course not a new observation. Also it was not possible to distinguish between reduction in total count and spore count because the test for spores called for boiling before spore plates were made, and the combined formaldehyde and boiling treatments may have been responsible for the apparent spore destruction.

In addition to the methods of treatment described, tests have been made with ultra-violet light, ethyl formate, and ethyl ether, all of which have been ineffective. Ethyl formate was used because, like ethylene oxide, it is used as a fumigant, and it was suggested that its destructive powers might extend to bacteria. Ethyl ether was used on the assumption that it might act as a solvent for certain cell constituents, in which case sterilisation would result from "induced autolysis." This mechanism was suggested in possible explanation of the results obtained with ethylene oxide, but conditions of treatment that were effective when the latter was used did not apply where the test was made with ether.

Summary

In general, spices as received by importers showed heavy contamination with bacteria. There may be an appreciable reduction in the bacterial content during their processing at the manufacturing plants through mechanical removal by screening methods.

Different lots of black pepper were subjected to heat, ranging from a treatment of 5 pounds of steam pressure for 5 minutes to 15 pounds of pressure for 15 minutes. Results indicated that the spice contamination varied in its resistance, but that a relatively mild treatment is effective in most instances. Cooking tests indicated a loss in potency of about 10 per cent. following a heat treatment of 15 minutes at 15 pounds of pressure.

Practical sterility of spices was obtained by the use of ethylene oxide. The effectiveness of this agent appeared to be due to a true germicidal property and not to a bacteriostatic action. Ethylene glycol was much less effective than ethylene oxide.

Only moderate destruction of vegetative forms or spores was accomplished by the use of ethyl formate.

Formaldehyde was effective, especially against spores, although destruction may have been due to the

combined effect of residual formaldehyde and the heat treatment used to destroy vegetative cells. With vegetative cells there may be a combined effect of destruction and bacteriostasis to account for the reductions which were noted.

Ultra-violet light and ethyl ether were ineffective in the tests which were made.

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The Biscuit Industry

APPROVED and adopted by the Cake and Biscuit Manufacturers' Wartime Alliance and submitted to the Ministry of Food is a report on the post-war rehabilitation of the biscuit industry. The report consists of a comprehensive plan designed as implementing the resolutions passed at the International Hot Springs Conference.

It visualises a progressive reinstatement of pre-war manufacture and trading divided into three stages—the first covering six months, the second twelve months, and the third two years after the cessation of hostilities with Germany.

The food value of biscuits has been clearly demonstrated throughout the war period, and it is anticipated that in post-war days there will be an even greater demand on this industry than ever before.

The problems of de-control are many, but two features are particularly outstanding. The first must be the restoration of factory space damaged by enemy action or requisitioned by the Government. When this is achieved there must be an organised and equitable removal of controls on raw materials, distribution, packaging, selling prices, and so forth. The attention of the Ministry of Food has already been focused on the details of this plan, so that there should be the least possible delay in its operation. It is imagined that the Government will see fit to grant an early restoration of buildng and space, since food must take a major place in world reconstruction.

Biscuit production, with at the present time less than one-third of its pre-war strength, will immediately be able to provide suitable employment for both men and women released from the forces and other war industries. Many of the latter are situated in close proximity to biscuit production plants, and a switch over would not therefore seem to present any major difficulties. Further, it is visualised that a number of women war workers may like to continue in employment until such time as their husbands return from the Services. The biscuit industry would certainly provide a suitable opening for such women.

It is at once obvious that, providing space is released and with a freer movement of labour, the biscuit industry would be capable of producing an increased tonnage for civilian needs in the immediate months after the cessation of hostilities. It cannot be overlooked, however, that there will be a natural expectation from the public for a return to greater variety, and it is with this in mind that the Council of the Cake and Biscuit Alliance visualises a progressive rehabilitation going hand in hand with the release of raw materials.

Note has been taken of the considerable part the biscuit industry played in exports before the war. There is no doubt that the British were the pioneers of biscuit manufacture and that British houses have long been acknowledged as bakers of the best biscuits in the world. It is assumed that the Government will wish to take advantage of this reputation, and from this point of view the claims of the industry must receive very early consideration. With the reopening of export markets comes a further demand for a reinstatement of peacetime standards. Raw materials, packaging, and the replacement of worn-out equipment all figure in the comprehensive programme this industry submits to the Government.

The discontinuation of the present zoning plan, which precludes any manufacturer from delivering outside a stipulated radius, is also part of the programme, together with an early reduction in points values and a final and complete elimination of price control restrictions.

It is generally acknowledged that under the auspices of the Cake and Biscuit Manufacturers' Wartime Alliance this important branch of food production in Great Britain has during the war been organised, not only to the complete satisfaction of the Ministry of Food, but with an eye to rendering the greatest possible service to forces and civilians alike.

It is confidently hoped by the industry that the plans now tabled will commend themselves and that in the early post-war days we shall see a speedy, progressive, and welcome return to normal biscuit supplies throughout the country.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in FOOD MANUFACTURE should not be taken as an indication that they are necessarily available for export.

Correspondence

How Hungry is Starving Europe?

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—Many thanks for the regular receipt of FOOD MANUFACTURE—France, Belgium and Holland, it finds me just the same.

I read the editorial in your November issue, "How Hungry is Starving Europe?" the subject being one that has caused a good deal of debate amongst ourselves. At different times I should think every subject has been debated amongst a crowd where every individual comes not only from a different English, etc., locality, but also from a different job in "civvy street."

Without exception, all of us made firm friends in Belgium, and our opinion of the Belgian people—however mixed they are—is very high, certainly the nicest and most genuine people we have so far met in this "Continental Tour."

As one goes about the people *appear* well fed, but, as you know, it is possible to go without *certain* foods for a long time without their lack becoming obvious in general physique. When we—as most of us have been—are approached with fantastic bribes for food, and hear stories from our English-speaking friends, we can get a clearer picture of the situation.

Although I and my friend Louis sat down to an excellent "steak and chip supper" with our Flemish hosts, we also learnt what sacrifices had to be made in order that we may be well entertained!

I recall in Brussels being offered 500 frs. for an ordinary small can of corned beef—the inevitable "Bully," which I was, regrettably, not able to supply.

The position briefly is that under Nazi administration the Belgian people received a small yet reasonable ration of those foods the Nazi had, including meat, ham, some cereals. For years they have had no proper fats but a certain amount of synthetic cooking oil. When entertained it was interesting to note that the Belgian ignored meat sandwiches in his pleasure at tasting cheese.

There is no shortage of sugar or confectionery nor has there been in five years.

Again, the "Continental" makes far more use of his vegetables than we do in England. At the moment there is sufficient bread, sugar, some cereals and a little meat, but tea and coffee are scarce and dear. Cocoa is not to be found even in the black market. There is little rice, no butter, cheese or margarine. No soap, yet plenty of candles.

The most awkward problem of all is the shortage of milk. It is given for babies only, but I very much doubt whether the milk I have seen has any good effect on infants, and, in any case, I am afraid it is "exchanged" for something more profitable to the parents.

I examined a kilo of "powdered milk" bought very dearly. I could do nothing with it and attempts to form any sort of emulsion, hot or cold, completely failed even to produce a whitish liquid. Tasting the product completely mystified me—I had hoped to find some soya flour. In the end I decided that it was nothing more than ground acorns and horse-chestnuts.

No, the Belgians are not exactly starving, but I do not think either that they are "living well." They are just about existing with what food they can get.

It so much reminds me of the old adage that "all is not gold that glitters."

Thank you for carrying on so splendidly.

Yours truly,

E. R. LEADBETTER, L.A.C.,
Royal Air Force, B.L.A.

Teamwork in Industry

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—Industry to-day is torn by conflicting elements. They underlie the economic problems which can always be solved given good-will amongst the people concerned. Rival ideas are the real trouble, and industry is becoming a battleground where the protagonists of philosophies that are foreign to our British tradition seek to force an issue on the country.

An increasing number of business men are becoming aware of this menace and believe that industry demands statesmanship. The far-seeing industrialist may have a greater chance of moulding the fate of our country than the average politician has.

What is Britain's high priority for reconstruction? Skilled engineers? Less control? School-teachers? New houses? The Minister of Reconstruction recently answered these question for us. He spoke of the teamwork achieved in industry over the last five years. "We have done it for the purposes of war," he said, "let us join in mutual respect to do it in peace."

Industrialists, Labour leaders, and millions of ordinary men and women from every part of Britain have worked as a team for the greatest achievement in our industrial history. They have shown what teamwork can do to win the war. The nation now calls for teamwork to win the peace and secure the better Britain which we are determined to have.

How can this war-time teamwork be preserved and enhanced to carry us on for the greater task of reconstruction? Some new factor is required.

Men of good-will on both sides of industry, worker and manager, must man the battle-line together. Side by side they must take their stand against the forces which divide industry by pursuing sectional or selfish interests. A confused and divided industry opens the way to the control of those who seek power and position. The answer to this is a force of patriots determined to stand as one.

That means change. And the change must come in every section of industry—change from grab to give, from pulling apart to pulling together. This teamwork is priority A1 for reconstruction; but Parliament can't vote it. Nor can money buy it. We must create it.

Yours truly,

A. G. HUTCHINSON.

Glasgow.

Compression of Dehydrated Vegetables

THE compression of dehydrated vegetables so as to save space in addition to the space and weight saved by the dehydration, is having experimental attention in the Agricultural Research Administration, U.S. Department of Agriculture. New equipment, including a 40-ton highly adjustable press, is now at work at the agricultural engineering laboratory of the Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Md.

The engineers have so designed the experimental equipment that many factors in the compression process can be varied for particular experiments: pressure, duration of pressure or "dwell," temperature of the material and the moisture content of the dehydrated material. The press is of commercial size and can turn out food briquettes rapidly, but is flexible so that the several important factors may be varied to retain the maximum of the original quality of the dehydrated products. Quality determinations are made by the Bureau of Human Nutrition and Home Economics. The experimental press can be used to press any kind of dehydrated food at pressures up to 5,600 lb. per square inch, and the pressure may be held at any point for a specified time, a factor that appears to be important in preparing briquettes that will hold their shape. Circulating hot water in both parts of the compression dies can be so controlled as to keep prior to pressing the temperature at any point between 100° and 210° F. while the pressure is applied.

The preheating of the food is imperative in producing highly compressed and non-crumbling briquettes. The preheating is done in a special conditioning vessel in which temperature and humidity may be varied as desired. One lb. dehydrated food briquettes of sweet potato, beet, carrot and cranberries will make 25, 34, 30 and 100 helpings, respectively.

Quick-cooling compartments have been constructed in the laboratory to determine if deterioration of quality in commercial food briquettes has been the result in some degree of the retention of the original heat in the interior of the mass for a long time after compression.—*U.S. Office of War Information.*

The Proper Use of Fuel

THE drive for fuel economy is of major importance to the war effort, and will be of equal importance for the reduction of costs of production after the war. The progress which the Fuel Efficiency campaign has made has aroused in the minds of those engaged in industry a desire to know more of the subject. Lectures, works visits and brains trust meetings which have been held in all parts of the country under the auspices of the Ministry of Fuel and Power have been attended by some 20,000 engineers, works managers, boiler and furnace operatives and others. The desire has been repeatedly expressed at these meetings that an authoritative textbook should be made available containing a permanent record of the subject matter of these discussions and lectures. This book* has now been issued as a comprehensive work to meet this need, and has been designed to give the whole story of the practice and principles of fuel utilization. In preparing it the Fuel Efficiency Committee of the Ministry of Fuel and Power has had the co-operation of over 200 experts, comprising most of the leading authorities on fuel utilisation in the country.

In undertaking this task the committee realised that no single existing textbook covers both the fundamental principles and the essential operating features necessary to obtain satisfactory results. The result is unique in that for the first time there has been gathered into one volume material for which previously it would have been necessary to consult perhaps twenty or more standard books. It is written in a form easily understandable, and is equally suitable for students of all ages and for the busy man in the works. The Minister of Fuel and Power in his foreword says: "This book, in which has been assembled a very great deal of information not readily available, will not only serve the present urgent need, but will be of permanent value to all those concerned with the industrial use of fuel."

Each of the 34 chapters into which the book is divided has been submitted for approval or criticism to a panel of experts in that particular branch of the subject. The nature and properties of all industrial fuels, solid, liquid and gaseous, are discussed, together with the effects of combustion. Information is given on such important matters as draught and chimney design, combustion technique, air supply and flue gas composition, clinker formation and prevention. The transmission of heat and the calculation of fluid flow are explained at some length; an important section published for the first time is the complete analysis from first principles of the flow of gases in a furnace system. Steam production, including boiler practice and testing, and steam utilisation are comprehensively treated. The measurement of fuels (solid, liquid and gaseous) and of steam is described and particulars are given of how to make measurements on site. Six chapters are devoted to furnaces, including gas producers, furnace management and technique, the application of fuel to special industries, electric furnaces, waste heat boilers and refractory and insulating materials.

The remainder of the book consists of information on a variety of subjects that are of the highest importance in fuel utilisation, such as central heating, the technique of drying and thermostatic control. Plant used for town gas (such as governors, burners, thermostats, valves and motors) is described. Petroleum and its utilisation as a fuel and the important subject of graphical heat balances are allotted chapters, while others are devoted to instruments, the sampling of solid and gaseous fuels, the analysis of coal (in which the meaning of coal analysis is explained simply for the practical man). The final chapter discusses the selection of the various fuels for industrial purposes. Three short appendices deal with the Fuel Research Coal Survey with steam tables and with entropy.

Every works engineer, every member of the technical and administrative staff of works which use fuel for any purpose, every fuel watcher, should have access to this important volume. It should find a place on the bookshelf of everyone who has anything to do with fuel and in the library of every works in the country.

* *The Efficient Use of Fuel.* Min. of Fuel and Power. London, 1944. 12s. 6d. net. Pp. 807+viii, with 303 illustrations.

Food Research in New Zealand

Scope of Investigations

THE Eighteenth Annual Report of the Department of Scientific and Industrial Research, New Zealand, has recently been issued. In his statement the Hon. D. G. Sullivan, Minister in Charge of the Scientific and Industrial Research Department, states that the continuation of the war has necessitated the maintenance of the Department's interests on matters directly relating to its prosecution and to the war economy of the Dominion's industries. The soundness of the development undertaken in previous years has been amply demonstrated by the continued help which the Dominion Laboratory, the Dominion Physical Laboratory, the Radio Development Laboratory, the Laboratories established in association with Auckland University and Canterbury University Colleges, have rendered to all branches of the fighting Services and to the production of munitions. Though with the recession of the Pacific front away from New Zealand the urgency of these needs has lessened, nevertheless all these sections of the Department still continue to render very valuable service towards the successful prosecution of the war. Opportunity has been taken also to test out the efficacy of this co-ordinated organization in handling certain manufacturing problems which will be of importance in the peacetime development of New Zealand industries.

Food Problems

Increased attention has been paid to food problems in view of the very serious situation which is developing on a world-wide scale. The range of the Department's activities enables it to render useful services in this direction.

Work has also been carried out on soil fertility problems: the Grasslands Division has evolved new strains of grass and the Agronomy Division improved grain, pulse and fodder crops. Valuable work has been done in the Plant Diseases and Entomology Divisions in reducing losses through the ravages of plant pests.

The Wheat Research Institute and the Dairy Research Institute have devised means for the better processing and the improvement of the quality of grain and dairy products. The Dominion Laboratory and the Plant Chemistry Laboratory have given valuable scientific assistance to the vegetable and fruit dehydration plants towards providing a product possessed of high nutritive value for use by the forces. As yet only the fringe of the food problem has been touched. The war and the post-war problems of food, the relation of food to health and nutrition, must be live interests of research in such an important food-producing country as is New Zealand.

Dairy Research

Dairy research work was again limited to the conduct of projects concerned with New Zealand's war effort.

Dry-butterfat Production.—The staff has continued, as circumstances required, to give advice on and assistance with the commercial production of dry butterfat by the method developed at the Institute. The dry-butterfat plant at Auckland, being run by the Internal Marketing Division, ceased regular operation in June, 1943. With the decision to export whey butter as butter, there has been no call for the plant to operate except for occasional runs to supply small quantities of butterfat for special purposes. Meanwhile, at the request of the United Kingdom Government, a further plant is being established at Frankton as a standby. The Institute has co-operated with the Internal Market Division in the designing and installation of the equipment.

Reconstitution of Butterfat to Butter.—Some trials have been made in the reconversion of dry butterfat to butter. It has been found that the use of a centrifugal homogeniser to emulsify the butterfat with skim-milk before churning in a butter-churn gave butter that rapidly turned fatty. By use of suitable baffles in the uptake pipe of the vacreator it has been possible to produce an adequate emulsification in the vacreator itself. The resultant creams when churned gave a butter with a cooked-fat flavour, but of excellent keeping quality even under high temperature contions. Arrangements are in hand for the trial of reconstitution by the margarine process.

Butter Substitutes

Butter and Cheese Spreads.—Work has been continued on the problem of finding a suitable butter substitute for use in tropical countries. The use of beef stearine as a hardening agent has been discontinued because of the accompanying animal flavour. Beeswax (4 per cent.) has been found to give a spread with satisfactory properties, but the supply of beeswax is limited. The only available alternative appears to be hydrogenated peanut-oil. In Australia the use of hydrogenated butterfat has been abandoned in favour of hydrogenated peanut-oil. Trials are at present being made of two batches of beeswax spread forwarded to the tropical areas.

A cheese spread made by admixture of dry butterfat with good-quality cheese has excellent promise, and arrangements are now well under way for a trial of production on the pilot-plant scale.

Taints

Land-cress Taint in Cream and Butter.—Work on this problem during the past year has given a clear indication that the benzyl isothiocyanate present in land-cress (*Coronopus didymus*) is not the cause of the peculiar "land-cress" taint in the butter from cows consuming land-cress. Garden-cress contains the same glucoside, and the benzyl isothiocyanate can be isolated from it in exactly the same way as for land-cress. When garden-cress was fed to cows in quantities of up to 7 lb. per feed, there was no sign of typical land-cress taint in the milk even after four successive days of the trial.

Land-cress, on the other hand, gave the taint in one day. It has been confirmed that land-cress taint does not always appear in the cream and butter from cows consuming land-cress. A herd of forty cows was grazed on a land-cress-infested paddock for six weeks

during the 1943 spring without the appearance of any land-cress taint in the butter. It is clear, therefore, that the causal agent of the taint has yet to be isolated, and that the passage of the taint into the milk is related to the general condition of the cow or to some other unknown factor.

Food Preservation

Dry Butterfat and Butterfat Spreads.—Since the commercial production of dry butterfat was taken over by the Internal Marketing Division when the Auckland plant was opened in August, 1942, the Dairy Research Institute has concentrated on the utilisation of dry butterfat in spreads for use by the armed forces under hot climatic conditions. Various hardening agents have been tried, with due regard to their effect on the palatability of the spreads and their availability in sufficient quantity in New Zealand, and bulk samples of the most promising products have been supplied to the New Zealand and United States of America Army authorities for trial under active service conditions. Dr. F. H. McDowall visited Australia in March to investigate work in progress on butterfat dehydration and the utilisation of dry butterfat for Army spreads.

Some work has also been carried out on the drying of natural cheese, and on the incorporation of mature cheese with dry butterfat, which gives a spread of excellent palatability.

With regard to improvements in dry butterfat processing and plant, the problems of devising a melter to deal with frozen butter and of further prolonging the storage life of dry butterfat by a more rigid exclusion of air at the time of filling are being investigated.

Dehydration

Dehydrated Meat.—The commercial dehydrated meat plant at Feilding, which is under the control of the Department of Agriculture, began production towards the end of March, 1942. The main developmental work during the period under review was concerned with (i) increasing the fat content up to 40 per cent. by the addition of edible rendered tallow; (ii) the installation of plant for the readditions of the concentrated cooking juices which improve flavour and palatability; (iii) the installation of plant for packaging the dried meat under compression in accordance with specifications of the United Kingdom Ministry of Food.

Various substitute containers have been tried, but none has proved capable of being substituted for tinplate.

Dehydrated Vegetables.—Commercial production of dehydrated vegetables began at the end of March, 1943, in a tunnel dehydrator of the Eidt type designed by the Chemical Engineering Section of the Dominion Laboratory and installed by arrangement with the Government at the Wattie Canneries, Hastings. The performance of this plant and the quality of its products have been fully up to the expectations based on prior research and development work. A dehydrator of similar design installed at the Wattie Canneries for the dehydration of apples on behalf of the Internal Marketing Division has now commenced production.

Research and development work on vegetable and apple dehydration has been proceeding along the following lines:

(1) Suitability of different varieties for dehydration, from the following aspects: Culture, processing, yield of dry matter, vitamin content, and appearance of finished product;
(2) Storage tests on experimental and commercial products;
(3) Methods of peeling (particularly lye and flame peeling), blanching, and compression.

Cheese-mites Research

The survey of cheese-mites in cheese-factories has brought to light additional information. It has been found that the constitution of mite colonies differs specifically in different factories. As the species differ in their physical reactions, information is being sought on the factors determining the incidence of each species. These observations are being carried out both in the factory and laboratory. The morphological taxonomic characters of all stages of each species have been studied, together with the duration of development of each stage of each species. These data are fundamental in the application of control measures.

The control of cheese-mites and the protection of cheese against them has been investigated. In this the influence of waxes, dusts, and fumigants has been studied. The experiments with waxes and dusts have shown that a measure of control and protection can be secured. In regard to fumigants, these have given promising results under some conditions.

Selection of Fumigants

The fumigants experimented with were ammonia, carbon dioxide, methyl bromide, and dichloroethyl ether. The first two proved unsuitable. Methyl bromide was found to be effective, but has certain disadvantages, and in searching for other substances it was decided to try dichloroethyl ether.

Though this substance has been experimented with as an insecticide against wireworms, woolly aphis, and as a glasshouse fumigant, it had never, until the present occasion, been used as an acaricide. The results of the experiment have been extremely satisfactory so far, in that the dichloroethyl ether has been found to be highly toxic to the common cheese-mite, *Tyroglyphus siro*, even at extremely low concentrations. For example, a concentration of 0·046 lb. per 1,000 cubic feet of air space gave 100 per cent. kill of the mites after twenty-four hours' exposure at 70° F. and 80 per cent. relative humidity. It was also found that timber such as shelving, crating, etc., which comes in contact with cheese, if treated with dichloroethyl ether, gives a very definite measure of protection to the cheese.

Another point considered is the effect of the acaricide on the cheese itself. A cheese kept for six weeks in an atmosphere saturated with dichloroethyl-ether vapour presented no foreign flavour in the interior of the cheese and only a slight off-flavour in the rind. Other cheeses were exposed to the vapour for shorter periods and no foreign flavour could be detected.

This work is being extended in order to procure more detailed and conclusive data.

The Coming Battle for Wheat

J. C. LUMSDEN

IN THEIR headlong rush to keep up production, Canadian farmers have not paused to ask: "Who has eaten the unsold wheat that was haunting us twelve months ago?"

Take Canada alone. At the end of the last crop year the Dominion had jammed the elevators with an all-time surplus of 600 million bushels. By the rules of supply and demand the price of grain should have kept on slumping, but it started to rise. It went on rising until Ottawa pegged the price of wheat and stopped grain exchange trading. On the Chicago market wheat went up and up. A tremendous demand for grain began emptying storage bins in the U.S. An emergency call went north, and Canada poured her surplus to the U.S. by the millions of bushels.

Who suddenly developed such a ravenous appetite for cereals? Not human beings. We had not started feeding hungry Europe. North America's wheat surplus has disappeared into new factories. This unexpected demand for grain stunned our pessimistic experts. Within six months it made their prophecies of over-production sound ridiculous. Canadian farmers could hardly believe the miracle, as war-burdened prairie rails rumbled day and night with the passage of wheat trains headed east and south.

Wheat for Industrial Markets

Experts are only human. They do not like to confess to mistakes. But in scoffing at the prophets—scientists who insisted that agriculture should produce for industrial markets—the conservative grain men made one of the biggest errors in economic history. For the wheat surplus has been sold on a market they said would never develop—a market created by scientific research.

In 1943 this market consumed over 200 million bushels of wheat. This year it will eat up more than 400 million bushels. In one new U.S. factory alone more than 150,000 bushels of wheat are swallowed up by mechanical throats and digested in chemical stomachs every day. In the first year of its operation one plant turned out 180 million pounds of synthetic rubber, all of which was made from grain. Such rubber-from-grain factories actually made possible the all-out Allied offensive, because they have produced eight out of every ten tons of synthetic rubber without which our armies, navies and air fleets could never have gone into action. This gigantic output of rubber, the much publicised rubber-from-petroleum factories proved unable to deliver. It is a fact that grain farmers not only have fed our troops but also have given them most of the rubber needed for the war.

But this is not a war story. Though some experts predict that this fabulous new market for grain will collapse after victory, some scientists vigorously deny it. The argument is getting feverishly hot. Nothing less than the prosperity of our farming people is at stake, for though food demands in Europe may take care of all the grain that can be produced for several years, permanent overseas markets cannot be relied on. It is therefore of keenest interest to hear what science has to say about the chances of wheat getting steady work in the factories.

New Processes

Developments are coming thick and fast from the research laboratories. New processes are making it possible for the first time to separate wheat into its two principal constituents—starch and protein. One bushel of wheat split up by simple, cheap, chemical treatment gives not only two gallons of alcohol but also six pounds of high-quality protein.

Wheat protein is highly nutritious, and has the advantage that it can be worked into a great variety of foods. Doubtless this form of food will never take the place of meat, but wheat protein can supply body-building nourishment every day of the week—and at one-eighth the price!

E. L. Hove and C. G. Harrel (*Cereal Chemistry*, XX, 2, 141) published results of their experiments with wheat germ protein which indicated its high biological value. They suggested that wheat germ can be utilised in the human dietary as a supplementary protein of high biological value.

Let us translate this into practical farming facts. The grain lands are in a position to supply the hungry millions of this world with protein nourishment: A cattle-raiser must demand £2 for the same amount of protein that a wheat farmer will be able to deliver for 5s. That is the startling kind of possibility which research is opening up.

Considering the process itself as worked out in the U.S. Department of Agriculture, it was discovered that something remarkable happened when wheat was ground into a pulp with water, then treated with sodium sulphite solution. Sulphite is a waste in paper mills, available at low cost. It causes the protein in wheat to clot and rise to the surface as a thick, yellow froth. When dried this stuff looks like powdered egg white. To make it into pure protein food for human consumption costs only a few pence a pound. All the starch in the wheat remains unharmed in the processing vats.

Starch Pulp

That is only half the story. The starch pulp is used for producing alcohol. From this we can begin to see what is being offered to the wheat farmer. Recently the Polish refugee scientist, Dr. M. M. Rosten, now working on alcohol production in Canada, summarised post-war possibilities: "The secret is to draw off the protein before fermentation sets in. These proteins will not only have high food value, but will eliminate 85 per cent. of the shipping cost of wheat. Factories will be established in the grain-growing areas."

Dealing with cash values, he said: "Using wheat

to produce alcohol for industry, and protein for food, and valuing the wheat protein at only 1s. 3d. per lb., means a billion pounds a year worth £1,500,000,000."

Returning to bushel prices, it means this: from every bushel of wheat can now be produced two gallons of industrial alcohol plus six pounds of protein food. This protein is worth, at the very least, £1 15s., which is more than the value of the alcohol. Therefore, alcohol for synthetic rubber, plastics, varnishes and a host of other post-war products, becomes a by-product in the manufacture of "protein foods." The protein pays all process costs, gives the farmer a top price for his grain, supplies the world with enormous quantities of needed food, cuts freight charges by four-fifths and still delivers two gallons of alcohol per bushel.

Wheat Alcohol

Wheat alcohol is now largely consumed in making synthetic rubber and explosives. Both Dr. Roston and Paul J. Kolochov, biochemical research expert of Joseph E. Seagram and Sons, Inc., point out that huge quantities of wheat can be converted into alcohol for use as fuel for cars, trucks and tractors.

Speaking to the Manitoba Industrial Development Board, Dr. Kolochov warned Canadian grain men: "We must increase our wheat crop for industrial purposes. We cannot depend on European markets for wheat to be used as bread." He added: "Cars, trucks, and buses are now running in Brazil on 80 per cent. alcohol and 20 per cent. petrol, with 100 per cent. straight alcohol as the ultimate goal." Canadian farmers heard this with bewilderment, for the Dominion is critically short of petroleum. If Canada's petrol engines burned 80 per cent. this would be a permanent home market for 400 million bushels of wheat every year, the whole difference between farm crises and national prosperity.

Australian Wheat-fuel Distilleries

Shortly after Dr. Kolochov's speech came the announcement from Australia that the first of four giant wheat-fuel distilleries had gone into commercial production. The total annual consumption will be 5,000,000 bushels of wheat, and the output 12,000,000 gallons of motor fuel. This is the world's first large-scale agricultural fuel project. It will be operated on a permanent basis, giving the Australian wheat farmer a guaranteed market and relieving the petrol shortage.

Enormous farmland factories would be required to convert the annual crop wastes of 200 million tons into fuel. Even if they paid very little for straw, stalks and corn cobs—say, 10s. a ton—this would mean hundreds of millions of pounds additional farm income. There is the added possibility that every farm will soon be able to make its own proto-product fuel, by simplified chemical devices now being worked out, for heating the house and fuelling the tractor. Some experts consider that this development will come before giant straw-petrol factories make their appearance on prairie landscape.

Industry is coming to the farmlands. If the vision of our statesmen and planners can rise to the daring of our scientists, their research on the lines indicated may put an end to agricultural depressions.

From Davenport to Llewellin

THE great difference between the degrees of preparedness to feed the people at the beginning of two world wars is described in one of the latest additions to food literature.*

The author is well qualified to describe British food control by reason of the two phases of his service—the first at the Ministry of Food Headquarters, Grosvenor House and Palace Chambers, 1917-1921, and the second commencing with the Food (Defence) Plans Departments of the Board of Trade, 1936, which later became the nucleus of the present Ministry of Food at the outbreak of war in September, 1939.

During his service, Sir Thomas came into intimate contact with all the outstanding people connected with food control and his impressions of their different personalities constitute an attractive aspect of his narrative.

The book is in two parts, the first dealing with the first world war and the second the present one. In the last war it took 18 months to form the first Ministry of Food, and another year passed before rationing was introduced. It is instructive to realise that "it was feared that national morale would be affected"!

Writing of the present war, the author, in stressing that the lesson of the previous war had been learnt, points out that before war had been declared in 1939 all emergency arrangements had been made, even to the printing of ration books and other forms which the householder would have to fill in. From August 31 to December 31, 1939, the first Statutory Rules and Orders were drafted. The first steps for securing the equitable distribution of food for the duration of the war had been taken.

Teething troubles of the first years are described, frequently with deftly introduced touches of humour. During the early period there were naturally the grousers at what they then termed the "Whitehall bureaucrats." We countered (states Sir Thomas) this with the following:

> Give us Whitehall with all the WA(I)LES
> Rather than the Wilhelmstrasse with its merciless TRAILS;
> Britain and the Empire, the lands of the free,
> The homes of true democracy.

Which effort perhaps demonstrates that organisation and not "poetry" was Whitehall's strong point.

The building up of the Ministry of Food under its different Ministers is described in an interesting style. Sir Thomas inclines somewhat to hyperbole when writing of his colleagues, but this must be considered indicative of the good relations existing among the personnel. He gives entertaining sketches of the first five Food Ministers of the last war—Lord Davenport, Lord Rhondda, Mr. J. R. Clynes, Mr. George H. Roberts and Mr. McCurdy, K.C.

The functions of the Ministry of Food have been many and varied. Not only has it been concerned with the buying of food on a colossal scale, but distributing it through trade channels, and the feeding of children and workpeople. In July, 1943, there were working throughout the country 2,115 British Restaurants, serving 615,000 meals a day.

* *The Unbroken Front*, by Sir Thomas G. Jones, K.B.E. Pp. 215+23. London. 8s. 6d. net.

Commenting on the future of food control, Sir Thomas Jones says: "Taking the long view, there is every indication that we have proved, by our experience in the period 1918-1943, that as long as commodities remain difficult and scarce either to grow or manufacture, some sort of planned control and distribution must operate.

"The front which the enemy first set out to break at the start of the war—the Food Front—still remains unbroken, and will, no doubt, be consolidated for the betterment of the world and mankind."

I recommend this highly readable and instructive book.

T. C.-W.

Food Technology

PREPARED by a group of specialists under the editorship of Morris B. Jacobs, senior chemist, Department of Health City of New York, is an ambitious work* on the chemistry and technology of food and food products. It consists of two volumes, the second one not having come to hand yet. Forty-one specialists have been concerned, and the whole field of the subject is covered in forty-eight chapters, twenty-three of which are contained in Volume 1.

Part I, on fundamentals, deals with the aspects of food chemistry which are common to all foods. A chapter is devoted to the physical chemistry of foods, and constitutes a useful but necessarily brief précis of the subject. Other chapters deal with the carbohydrates and considerable space is given to structure and classification. Further chapters deal with lipids, amino-acids, enzymes, vitamins, hormones, mineral and colouring matters, digestion, and food poisoning.

Part II deals with the separate types of foods and food products, and collates a considerable amount of material from official, scientific and technical literature.

The foods treated in Volume 1 include milk, cream and dairy products; meat and meat products; fish, shellfish and crustacea; poultry and eggs; edible oils and fats; cereal grains; baking and bakery products; vegetables, mushrooms, nuts and fruits; carbohydrate and sugar foods; confectionery and cacao products; coffee and tea, and flavours, spices and condiments.

As might be expected from a work which has been prepared by different experts, the treatment of their subject varies a little, although the general balance of the book has been maintained. It mainly consists of the elaboration of principles rather than practice, although a number of formulæ and recipes are given.

The majority of the contributors are food chemists or university professors; consequently the book will appeal more to the chemist, physicist and bacteriologist than the practical man in the industry, although the latter should find it useful in enlarging his knowledge of the why and wherefore of his work, and in guiding his reading of the literature of his subject.

At the end of each chapter a selected bibliography is appended and the index is a good one.

* *Chemistry and Technology of Food and Food Products*, by a group of specialists, under the editorship of Morris B. Jacobs, Ph.D. Vol. I. Pp. 952+xv. Individual vol., $10.50. Set of two volumes, $19.00.

T. C.-W.

War-time Leases

To understand the Validation of War-Time Leases Act, 1944, it should be noted that for a lease to be legal it must be for a definite period or with the termination date capable of being ascertained, yet many agreements have been entered into for just the duration of the war or similar phrase, which of course does not meet the legal requirement, and so such leases are illegal.

This Act, however, makes such agreements of legal effect and provides that any agreement, whether entered into before or after the passing of this Act, which purports to grant a tenancy for the duration of the war shall have effect as if it granted a lease for ten years, subject, however, to the right of either the landlord or tenant to determine the tenancy if the war ends before the expiration of that term by at least a month's notice in writing given after the end of the war.

If the agreement makes provision for the termination of the tenancy by "notice" before the end of the war that provision has effect. This is useful where the landlord may have given the tenant the right to give notice while binding himself for the duration of the war; therefore the position for the tenant remains as it is, and so far as the landlord's part of the agreement the position is legalised. Where the agreement provides for a notice to be given after the end of the war, that notice applies; there is nothing to prevent the notice being for a shorter or longer period than the month mentioned in the Act.

As regards the period "ten years," this really is to make the lease legal by there being a definite period, but it could have been 20, 99, 999, or any other definite period for that matter, although "ten years" has been chosen so that certain provisions of the War Damage Act as regards the contribution as between landlord and tenant are unaffected. Otherwise it really is a notional figure as shown, but if the agreement grants a tenancy for a specified period or the duration of the war, whichever is the shorter, that period will apply instead of the ten years; suppose the specified period was five years, however, the lease is ended, if agreement was made early enough. If the agreement was for the duration of the war or for a specified period, whichever is the longer, and the war ends before the specified period, the agreement will apply for that period and not for a tenancy such as this Act provides; if the specified period was five years, then such an agreement will continue for the duration of the war, such period, of course, being now the longer, and this Act legalises the position in this direction.

Where in defining the terms of the agreement the expression "the war" or "hostilities" or "the emergency," and so forth, is used without anything to show whether the agreement is to apply for the war against any one country or all the enemy countries, the agreement is to apply as if it referred to those countries with which we were at war at the date when the agreement was made, unless it is shown that the parties intended that the expression used should be otherwise construed. As a consequence, if the agreement was entered into before December, 1941, the war with Japan would ordinarily be considered as outside the agreement. The dates to apply for the end of the war against any or all of the enemy countries will be laid down in Orders in Council.

Canned Frogs

ERIC HARDY

THE American Frog Canning Company of New Orleans, La., runs out a press advert.: "Large Market Waiting! Canned frog legs opens up a new, giant market. Demand exceeds supply. Get the facts on this new industry. Our big free illustrated book, *A Fortune in Frogs*, explains everything." I didn't write up for the free booklet when I cut that ad. out of a magazine in Minneapolis, for I knew that the world's largest frog dealers encourage hundreds of people with back garden ponds to earn a side-line breeding Nufond giant bull-frogs which weigh up to about three pounds, and which sell at one to five dollars per dozen.

Frogs for British Tables?

Might not something like that be done in England? Frog-legs are both a delicacy and a valuable source of protein. We have edible frogs of the sort the French have eaten as a delicacy for generations, living wild in our country, and in most of the towns there are hundreds of enthusiastic amateur aquarists and pond-keepers simply kicking their heels for something to do with their hobby now that the rare tropical fish are no longer imported for them. If these edible frogs could be bred for food in lily ponds and streams, and also collected wild from the countryside, then the available supply for a canning industry could be augmented by the abundance of the large edible snails found in Wiltshire, the Home Counties and elsewhere, to mix with the wild and garden herbs, salads and seasonings to make a most valuable soup.

Overcoming Public Prejudice

If the American canning industry without the aid of war-time food shortage can overcome the public prejudice of the unconventional idea of eating frogs, surely the British canning industry could do so. And what would make a finer pack than a fancy recipe of wild rabbit, edible frog (or edible snail), flavoured with onion (or wild chives or garlic) and mixed herbs? In London alone there were a score of aquarist clubs with over 2,000 members at the outbreak of war, and many of these enthusiasts could be encouraged to take part in a frog-breeding industry, just as some of them have earned profitable sidelines breeding goldfish. Breeding frogs for food would be much quicker than breeding carp, roach, trout or even eels, of which we have heard so much and seen so little. Indeed, the American bull-frog can be imported for the experiments, and as it will lay up to 10,000 eggs a year—and a weedy pond, tank or water-tub of almost any temperature will suffice—the food contribution would be much greater than the nettle tea and cowslip wine people write so much about.

Possibly not many people realise that we have two frogs in England—the ordinary common frog of school-time tadpole days and the edible frog, *Rana esculenta*, which is distinguished by its grey instead of black temples on the side of the head, and the spots on the hinder part of its thighs. It is rather larger than the common frog, more greenish in general hue and with distinctly black patterning. Like the American bull-frog, the male has a distended vocal sac behind the head, with which he makes his spring courtship calls. More aquatic than our common frog, it is really a Continental native, ranging across Europe and Asia to Japan and North Africa. In England it is confined chiefly to the eastern counties, but it can easily be bred and reared artificially, fed upon worms, insects and snails or even young common frogs. Many country boys know it as the green frog or water-frog, for it is more often found in water than on land.

British Species

The edible frog was originally introduced to this country for its value as a delicacy possibly to the Romans, and later for the big London hotels, and those that escaped or were turned into the countryside quickly bred and established themselves in the wild. There is a dark race inhabiting the Cambridge fens and a green race in Norfolk. The use of the flesh for food probably led to its introduction into Cambridgeshire by the monks. The Norfolk colony was imported about 1837 and 1842. These specimens are slightly smaller than the Continental specimens eaten by the French.

American Edible Frogs

The American edible frogs are considerably larger than our European specimens, and their legs, which are the only part eaten, are sometimes as big as those of a young chicken. Very large specimens are collected from the prairies near Chicago, and a *fricassee* of frogs' legs may be obtained at many a Chicago hotel; when tasted they are found to be rather insipid, like very young chickens, for which they have been mistaken by English visitors. The olive-brown bull-frog grows to more than seven inches long, and there are plenty of specimens in Canada.

Personally I would advocate coupling with the Government's proposed eel-breeding schemes a large-scale frog-breeding industry for food at the same muddy marshlands of East Anglia, the Cheshire meres, and the clean rivers and brooks, so that the labour can be pooled and waste avoided. The difficulty of fish-breeding in most places is that it is so slow that the war will be over before any really effective carp-breeding scheme can be established in this country, for it takes at least four years to build up a food-productive carp pit. Many old trout hatcheries and lily ponds could be converted into froggeries, and even without the very useful if sensational advertising of the American Frog Canning Company, there could be built up a valuable public frog-breeding supply for the canners. But we don't want to use common frogs, and if we can import and breed bull-frogs, so much the better. Traditional prejudice against edible frogs, like traditional prejudice against brown bread, should be ignored in these times.

Reformers of the Englishman's Food

M. SCHOFIELD, M.A.

FROM halfway through the eighteenth century to the beginning of the present one the efforts of three cookery reformers were particularly in prominence. In 1747 Mrs. Hannah Glasse published her *Art of Cookery*; in 1822 a Dr. William Kitchiner followed with his *Cook's Oracle*; while in 1859 Mrs. Isabella Mary Mayson Beeton began her "four years of arduous labour" in compiling that monumental work known as *Beeton's Household Management*—a work which, to the chagrin of the *littérateurs*, has perpetuated the name of Beeton far more than did the work of her husband as publisher of Harriet Beecher Stowe's *Uncle Tom's Cabin*. That reform was (and still is?) necessary may be gathered from the vehement condemnation of English food by Englishmen, who held that "God sends good meat, the devil sends cooks," and by visitors to our island. "They have only three vegetables and two of them are cabbage" . . . "Prodigious quantities of brown fluid called coffee" . . . "That huge round of parboiled ox flesh, with sodden dumplings floating in a saline, greasy mixture, surrounded by carrots looking red with disgust, and turnips pale with dismay." Such were descriptions of a state of affairs which a cook-cum-physician and two Englishwomen sought to remedy. "Cookery has become an art, a noble science," wrote Burton in his *Anatomy of Melancholy*. Yet to two ladies was due much of the effort to make cooks in this country, in a country where puddings, beef and mutton seemed to have been our foundation-stones since the days of Crécy and Agincourt—victories attributed to beef and mutton—or since St. George was depicted holding aloft a sirloin on his spear. The efforts of Mesdames Glasse and Beeton are hardly comparable with the epic work of Brillat-Savarin. But then he was writing in a land exceptional where cookery was concerned—a country which produced such men as Vatel, maître d'hotel to the Prince de Conde, who committed suicide because the fish ordered from Boulogne arrived late.

Hannah Glasse

Hannah Glasse merits first consideration, not only from the point of view of historical sequence, but since our encyclopædias find space for Mrs. Beeton but not for her predecessor. This may be due in part to the lack of information concerning Hannah Glasse herself. She flourished "circa 1747" is all that the Dictionary of National Biography can tell; it is her work which gives an insight into what were her tastes and prejudices. 1747 brought her *Art of Cookery, Made Plain and Easy, which far exceeds any Thing of the Kind yet published.* It was "By a Lady"—this was merely an indication of her desire for anonymity in a first edition. It was printed "for the Author" and sold at Mrs. Ashburn's China Shop, at the corner of Fleet-Ditch. Other editions followed, proclaiming the success of the work and having the name of the authoress included. 1751 saw a fourth edition, 1765 a ninth. Mrs. Glasse also wrote *The Compleat Confectioner: or the Whole Art of Confectionery Made Plain and Easy* (though the confectionery itself was not always plain!). Since she also produced *The Servant's Directory or Housekeeper's Companion*, Hannah Glasse may truly be regarded as the forerunner of Mrs. Beeton in compiling complete household guides. Mrs. Glasse early excuses herself for lack of style, and soon has her say against French cooks monopolising matters in cookery.

> If I have not wrote in the high polite Stile, I hope I shall be forgiven; for my Intention is to instruct the lower sort, and therefore must treat them in their own way. In many ways the great Cooks have such a high way of expressing themselves that the poor Girls are at a loss to know what they mean; and in all Receipt books yet printed, there are such an odd Jumble of Things as would quite spoil a good Dish. I have heard of a Cook that will use six pounds of butter to fry a dozen eggs, when every Baby knows that understands cooking that half a pound is full enough. . . . But then it would not be French. So much is the blind Folly of this Age, that they would rather be impos'd upon by a French Booby, than give Encouragement to a good English cook.

So Mrs. Glasse sets forth with her instructions to stew Ox Palates, to "ragoo" a leg of Mutton, to make a brown Fricasey or a white Fricasey, to "fricasey" chickens or even tripe. In days of plenty there are details for spitting a pig or roasting one until its eyes drop out to signify it is completed. A mere fricasey of pigeons requires eight pigeons newly killed and a pint of claret. To roast a turkey in "the Genteel way" is to stuff it with fowl or veal and herbs. Veal appears as "a disguised leg of veal," as "olives of veal" or "bombarded veal"; mutton as "Harrico of mutton," or "a Shoulder of Mutton in Epigram." And when she gets to the sweets and confectionery, again there are no days of austerity to contend with. Her "Blanched Cream" requires twenty egg whites; her "Everlasting Syllabubs" five and a half pints of "the thickest cream you can get," plus half a pint of Rhenish and half of sack.

William Kitchiner

Although Dr. Johnson maintained that "women can spin very well, but they cannot make a good book of cookery," and that he "could write a better book of cookery than has ever been written," he failed to put his precept into practice. So one has to turn to William Kitchiner, M.D., for the man's share in trying to reform the Englishman's food of last century. Kitchiner was the son of a coal merchant and justice of peace for Westminster. He was born some time in the 1770's, died in 1827, and was buried at St. Clement Danes. He graduated doctor of medicine at Glasgow, was not thereby allowed to practise in London, yet this did not worry him, since a fortune inherited from his father enabled him to spend his days dabbling in science, studying optics and music, and indulging in any eccentricity he fancied. He seems to have been a

prolific writer on telescopes and other optical instruments; on *Maxims for Locomotion* under the title of *The Traveller's Oracle*; and published *The Housekeeper's Oracle, containing a System of Carving, the Art of Managing Servants, and the Economist and Epicure's Calendar.* He was an epicure, convinced that the health depends to a great extent on the food we eat—hence his many experiments in his own home on food preparations. Kitchiner was no mere dabbler where food was concerned. He possessed considerable skill as a cook, and was famed for meals he served to his chosen circle of friends, despite his motto of " filling the plates and sending them round instead of making civil faces at your guests."

An Apostle of Good Food

In 1817 appeared the first edition of his *Apicius Redivivus, or the Cook's Oracle*, which proclaimed to be a book of " Receipts for Plain Cookery and the Art of composing the most simple and most highly finished Broths, Gravies, Soups, Store Sauces and Flavouring Essences. The quantity of each Article is Accurately stated by Weight and Measure "—the latter seems the answer to everyday instructions for taking " a pinch" or " a handful " of salt, with no allowance for difference in sizes of hands in case of a buxom cook or dainty housewife! Kitchiner claims that his book was " the result of actual experiments in the kitchen of a physician," and that he had read all the 250 books or pamphlets on cookery or food which he listed at the end of his volume. Other editions followed at intervals. The author of *The Art of Invigorating Life by Food* adds in the fourth edition some hundred and thirty " New Receipts for Pastry, Preserves, and Puddings, and An Easy, Certain and Economical process for preparing Pickles, By which they will be ready in a Fortnight and remain good for years." As a physician he considered it strange, " passing strange," that persons will bestow less attention on their own health than they devote to their dogs and horses. He believed in his " invigorating life " not only by food but by " clothes, air, exercise, wine and sleep," and he wrote his *Peptic Precepts* to furnish " Agreeable and effectual Methods to prevent and relieve Indigestion." As in the case of Hannah Glasse, who included instructions " for treating the bite of a mad dog and for the plague " in her book, so does Kitchiner add to his methods of relieving indigestion " the Pleasure of Making a Will "!

A Link between Glasse and Beeton

Yet Kitchiner made a serious attempt to improve the Englishman's food with his " gastrology." He sought to " contend with the prejudices of the Ignorant "; to demonstrate the art of cookery " because no one else here has," because he " knew not how he could employ his leisure hours with more benefit for mankind." He refers to the *Code Pharmaceutique* of Parmentier (that physician to the Invalides who championed potato cultivation in France), in which there is a chapter on food; and then introduces his own recipes " as a humble attempt to form a sort of appendix to the Pharmaceutique." He refers also to the excellent cookery met with in France, to the " toujours gai " attitude of Frenchmen due to their good food and " elastic stomachs," and coins the phrase: " As many Frenchmen, as many Cooks." Kitchiner, assisted as he was by Henry Osborne, cook to Sir Joseph Banks, forms a link between Hannah Glasse and Isabella Beeton, a link of masculine gender and thus an answer to those who contended that cooking in this country was a woman's business.

Isabella Beeton

Finally one turns to that indefatigable worker in the cause of English cookery, to Isabella Beeton, compiler of over 4,000 recipes and other household helps. For four years she laboured with this mammoth volume; two years later, as if to prove her life was her work, she died at the age of 29. Her philosophy, like that of Kitchiner, was the dependence of health on food: " One of the chief considerations of life is, or ought to be, the food we eat, for our physical well-being depends mainly on diet." "A good cook has reason to magnify her office; her work influences not only the comfort but the health of the entire household." She held that there is no more fruitful source of family discord than badly cooked dinners and untidy ways. " Men are so well served out of doors—at clubs, hotels and restaurants," she continues (though one doubts this!), " that to compete with the attractions of these places, a mistress must be thoroughly acquainted with the theory and practice of cookery."

Such were the maxims which drove her to her classic with its 80,000 sq. inches of print, with " more wisdom to the sq. inch than any other work of man," or so maintains the heroine of Conan Doyle's *A Duet, with an Occasional Chorus*, who also held that Mrs. Beeton must have been the finest housekeeper in the world, and therefore Mr. Beeton must have been the happiest and most comfortable man. Perhaps this accounts for Beeton, although under no copyright obligation, travelling personally to the United States to present Harriet Beecher Stowe with a cheque for £500, which was no mean sum in those days of publishing. In passing it may be noted that a Miss Hartill in a Clemence Dane's novel has praise no less fervent: " If you come to actual value, I'd rather do without Shakespeare than Mrs. Beeton." Throughout this great volume of " the guide, philosopher and friend of countless happy homes " one appreciates the thoroughness, the painstaking manner of this young food reformer. The duties of the cook, she maintains, involve getting up at six in summer and seven in the winter. It involves marketing, choosing the right sort of beef, " deep red and marbled with pale yellow fat, or mutton from a four to five years sheep for preference, or lamb firm of flesh and with fat of pearly white." She casts her eyes on the downland sheep only with a view to its demise and its consumption by man. Mrs. Beeton would never have survived today's rationing and queueing, or the necessity of taking whatever the butcher offers or whatever strange fish is displayed on the cold slab of the fishmonger. Her masterly manner tells of purchasing eggs armed with a speculum, with " an interior looking-glass," rendering the egg sufficiently transparent to show whether it is fresh or bad. Though her recipes are sumptuous at times, economy is yet a keynote. " Never waste anything that can be turned to account." Stock pots, digesters and other apparatus of the kitchen are fully surveyed. Stock as the basis of many dishes must always be at hand, in conjunction with sweet herbs and spices for seasoning. In

the larder " there is a place for everything and everything in its place." " Go every morning to the larder : take notice if there is anything not likely to keep," is yet another of her maxims. The preparation of dinner is the *raison d'être* of the cook : the dressing and serving of the various dishes with skill and ingenuity is the grand culmination of the day. Haste, but do not hurry, she advises, but work with a method. Every dish must be timed and none let go cold for lack of hot plates. In carving there must be no jagged slices, but clean incision—" a saw-like action should never enter into the operation." And the recipes? Unlike Hannah Glasse, she wastes no time in condemning " French boobies," and hardly hesitates to adopt French captions. From a menu for "Un Souper de Bal " to a luncheon for a shooting party or even a menu for "a Small Family Supper," she maintains that high standard of her precepts ; from her *Homard à la Diable* and *Galantine de Dindonneau* of the former to her *Chateaubriand Grillé* of the latter, the great theme goes on with infinite care. And even when she comes to the simpler dishes or sweets, the mark of the master chef is there. There is none of that spoonful of stewed apple flanked by an alien and obviously disconnected segment of pastry so often served in our hotels. Rather is there that simple yet attractive confection which a former Lord Dudley missed as he gazed at the well-laden board of Prince Esterhazy and cried : " God bless my soul--no apple pie ! "

Personnel for Industry

In his opening address on " The Selection and Training of Personnel for Industry," given under the auspices of the London and Home Counties Branch of the Institute of Physics, Major F. A. Freeth, F.R.I.C., F.Inst.P., F.R.S.. said that the points to be kept in mind when making a selection were a man's general intelligence and the possibility of his development over a long period in the right atmosphere. Interviews should be kept as informal as possible, and the greatest pains should be taken to make the candidate feel at his best and at his ease. Every endeavour should be made to find out his likes and intellectual interests. The greatest allowances should be made, especially at the present time, for the effect of the war upon his educational career ; and at all times the most sympathetic allowances should be made for a man who has not had much chance of general education and experience of the world in his youth. Within industry itself, every possible effort, he said, should be made to encourage scientific and intellectual enthusiasm. When possible the stimulus of travel and visits to scientific and technical conferences should be used. The man in industry should be encouraged to be on particularly good terms with people in that branch of science in which he is engaged who are in the Universities. He thought that men whose performance in University examinations had been poor should not be overlooked, as there might be some good reason for this. Generally speaking, people who did well in examinations were industrious and they may very well have brains, but occasionally success in them proved to be no more than a feat of memory. Major Freeth commended the selection work of psychologists in this war, and thought that every encouragement should be given to them to assist in similar problems for industrial recruitment. He thought the crux of the whole matter was to regard a man's education as having for its purpose " getting him into a frame of mind where he will go on building up on himself for the rest of his life, or in other words his degree is merely an incident in his upward flight." "The other end of the scale," he said, "is the man who on obtaining his degree, says : ' I'm qualified,' and potters along till he reaches his grave." He deprecated the idea that a man was a kind of *doctor mirabilis* when he had graduated, and said that he had never been happy about the Ph.D. degree. He pleaded for more training in the writing of clear English, particularly for those who had to present reports and appreciations of other people's work.

Income Tax and Scientific Research

What is income and what is capital is usually the determining factor as to whether sums are chargeable with income-tax or otherwise, and seldom is a capital amount paid deductible from profits. By the Finance Act, 1944, however, certain expenditure in connexion with scientific research is to be allowable, and this applies to sums of a capital nature as well as sums paid otherwise. It should be understood that the term " scientific research " means any activities in the fields of natural or applied science for the extension of knowledge and in relation to a trade includes any such research as may lead to or facilitate an extension of that trade and to research of a medical nature relating to the welfare of workers employed in that trade.

As regards expenditure not of a capital nature, this is allowable as a trading expense whether the research is undertaken by the trader himself or on his behalf, if related to the particular trade. Moreover, any amount (whether of a capital nature or otherwise) paid to an association, the object of which is the undertaking of scientific research related to the class of trade, is to be similarly allowed, and this applies to any sum paid to be used for such scientific research to a university, college, research institution or other similar institution. The association or university, etc., however, must be one approved by the Committee of the Privy Council for Scientific and Industrial Research or the Council for Medical or Agricultural Research established under the appropriate Privy Council Committee. Therefore such things as salaries, cost of materials, repairs and so forth, subscriptions, etc., in connexion with research matters will be allowed as trading expenses as and when incurred.

It might be added that for some time subscriptions and so forth made to research bodies domestic to the particular trade have been allowed as deductions, but sums of a capital nature have not ; these new provisions now allow sums in the last-named category and legalises the position as regards the other payments.

Where the expenditure is of a capital nature (say,

sums expended on laboratory buildings, plant and machinery and so forth) this also is allowable as a deduction, but the allowance will be spread over five years of assessment, one-fifth of such expenditure being deductible for each of the appropriate five years. It should be noted that this new angle of approach as regards tax will apply not only to expenditure by firms already operating but also where scientific research expenditure is incurred and a business afterwards started arising out of such research.

A point of interest is that while the actual date of operation of these provisions is not yet published, any expenditure actually incurred on scientific research before the appointed date of commencement will be deductible as if made after that date, meaning that deductions will be allowable for money actually paid, but not to money set aside to be expended later on.

While the statutory provisions to apply the above provisions to Excess Profits Tax have not yet been passed, these with modifications will eventually apply to this tax as to income-tax; the E.P. Tax, of course, is assessed mostly on income-tax principles.

Bacteriological Examination of Hams

In a report on bacteriological examination of ready-to-eat hams, in the New Jersey *Public Health News*, P. B. Silvester and John H. Spooner, New Jersey State Department of Health, drew the rather broad conclusions that ham is an important factor as a cause of food poisoning, that pickling fluids and gelatin were found to contain bacteria; that hams exposed during processing to a temperature of 142 to 150° F. were not sufficiently cooked to render them uniformly safe for consumption as food; that approval of such insufficient cooking should be immediately withdrawn and that branding of contaminated products as " ready-to-eat " should be discontinued.

The study was carried out early in 1943 and dealt with hams sold to the consumer as ready-to-eat. Hams processed within New Jersey were sampled at the processing plants and out-of-state hams were examined at retail stores. After describing the pumping, curing and smoking procedure employed in the New Jersey plants (all U.S. inspected), the report states that sampling of the pickling fluids in use disclosed heavy bacterial content and in many cases mould also. Gelatin used for dipping to facilitate packaging was also found to contain bacteria.

Five samples of 37 from New Jersey processed ready-to-eat pork products—boiled hams, ready-to-eat hams, and ready-to-eat butts—were found to contain bacteria. Five samples of 32 from out-of-state pork products also showed internal bacteria. Except for mention of the organisms found, the degree of contamination was not described.

In 16 curing pickles tested the investigators found bacteria ranging from 15 to 2,100 per c.c. and 10 samples showed mould.

The report states that " the processes of pickling, subjecting to heat by water or water vapour and mild smoking, to the degree described, do not result in the production of a product uniformly free from organisms commonly associated with food poisoning. It is not difficult to understand why outbreaks of food poisoning may be caused by such products, even though they have been processed by standard trade practices, in accordance with approved controls of federal regulatory authorities."—*National Provisioner.*

Hydrolysis of Starches

The enzymic hydrolysis of starches is the basic process for a number of important industrial operations, including the preparation of grain alcohol, beer, and certain dextrins for adhesives and sizes. The enzymes most frequently employed for these purposes are those found in barley malt. Other sources of similar enzymes have long been known, but their general application in place of malt has not been practicable because of the lack of knowledge of their action. In conjunction with the Wheat-Alcohol Committee of the War Production Board, William W. Pigman of the Bureau's polarimetry section has studied the application of various types of enzyme preparations for the conversion of starches into substances fermentable by yeasts. The more important results of the work, as applied to commercial starches, are reported in RP1599 in the August *Journal of Research.* An investigation of the extent of hydrolysis of starches by amylases has revealed that enzyme preparations made from certain moulds (*aspergillus* species), as well as barley malt, are able to break down starches completely to fermentable sugars in the presence of yeasts. Enzyme preparations made from some bacteria (*Bacillus mesentericus*) and from pancreases do not break down starches completely to fermentable sugars, even if the enzymic action takes place in the presence of yeasts. The so-called β-amylases, found particularly in wheat and soya beans, also do not bring about complete saccharification. For certain of these enzyme types, the apparent absence of complete hydrolysis to fermentable sugars seems to be due to the synthesis of unfermentable materials from the products of hydrolysis. The synthesis of such substances by the action of the enzyme preparations on maltose is demonstrated, and the nature of the actions of the various types of enzymes which hydrolyse starch is discussed in relation to the structures of the various starch substances. A procedure for the liquefaction of starch suspensions without the intermediate formation of gels is given.—*Technical News Bulletin.*

"FOOD MANUFACTURE" 1944 INDEX

The 1944 Index of Food Manufacture will be ready shortly, and copies will be available to subscribers on receipt of a stamped addressed envelope.

It is recommended that the envelope be 10 inches by 8 inches to avoid undue folding of the Index.

Trade News

Air Conditioning Developments

Although the Andrew Machine Construction Company, Ltd., have been almost entirely on vital war production during the war, they have not neglected the perfection of designs in the air conditioning and air filtering sphere for production in the post-war period. Several entirely new developments will be and are available which mark definite advances in methods of air treatment.

A ductless system of air conditioning under full automatic control is a new development, and the makers claim for it a wide application in that it overcomes the obvious disadvantages of a ducting system without sacrifice of efficiency.

* * *

Anti-Vibration Balance Table

A new support to enable sensitive instruments to be used under conditions of vibration—high or low frequency, intermittent or continuous, mild or severe—has been evolved by Griffin and Tatlock, Ltd. It embodies the effective compromise between unstable delicacy and completely stable rigidity. It is applicable to all types of balances, analytical, projection reading, microchemical, etc., as well as to instruments of other types—galvanometers, kymographs, electrometers; in short, to any instrument which needs to be protected, when in use, from vibration of any kind. Leaflets describing the device are available.

* * *

Dried Bananas

The Personal Service League has consulted the British Hospitals Association in regard to the distribution of a substantial gift of dried bananas. The League has accepted the suggestion that some of the dried bananas should be held in reserve for cases of cœliac disease or other emergency. Applications for supplies may be made to the Personal Service League, 41, Lowndes Square, London, S.W.1. Telephone, Sloane 6291.

Flexible Pipe Union

We have received a leaflet describing the flexible pipe union made by Clayflex, Ltd., which has been extensively adopted in many industries. Assembled it is very little different from a normal union, but is claimed to be a positive protection against fuel and oil pipe fractures due to vibration by virtue of its unique construction features.

The synthetic rubber gasket which is compressed by the tightening of the union nut automatically flares the pipe and at the same time provides a positive joint that is both leak-proof and flexible. The union will withstand pressure up to 1,500 lb. per square inch, and high-pressure types are also available designed to take care of pressures up to 6,000 lb. per square inch.

* * *

Post-War Science

A conference to discuss the use of science in the post-war world will be held at the Caxton Hall, London, S.W.1, on February 17 and 18, 1945. It is being organised by the Association of Scientific Workers in order to draw attention to the need for science to be used as fully in peace-time as it has been during the war. In earlier conferences the Association has dealt with the integration of science in the war effort, the need for more central planning, and for more use of the initiative of the younger working scientists. With the approaching victory of the United Nations it is necessary to show in practical terms what science and technology can do to provide the basis for an expanding world economy, and to satisfy the material and cultural needs of the people of the world. The power of science must be fully used by the community; if fully used a richer world can be achieved than we have ever known before.

Further particulars will be issued later, and may be obtained from the Association of Scientific Workers, Hanover House, 73, High Holborn, London, W.C.1.

Confectioners' Benevolent Fund

The following appeal has been issued by Mr. Laurence E. H. Roberts, President of the Confectioners' Benevolent Fund:

"I have the honour to make the annual appeal for the above splendid cause, and whether or not full victory in Europe may have been achieved when you receive this letter, it is not, I believe, too soon to ask you to make a donation in keeping with the feeling of thanksgiving that is rising in our hearts.

"Thanks to past generosity, the Executive Committee, now consisting of representatives appointed by the many regional committees and the trade associations, will be able, if the need arises, substantially to extend the number of pensions and grants to the aged and distressed, and in addition the scope of the Fund has been enlarged to provide for the education and maintenance of a number of fatherless children of members of the trade. A detailed scheme is being prepared.

"I trust and believe that these facts will lead you to give even more generously than in the past to help to raise the record of our collections.

"If you have already made your gift, I thank you, and, if not, I would ask you to send as generous an amount as you can spare, or even a little more, either to myself at the above address or to your local committee or trade association.

"Every donation will be credited to the total of your regional committee."

* * *

Mr. R. A. Bellwood

It is with regret that we learn of the death of Mr. R. A. Bellwood, which took place on October 27, after a short illness.

Mr. Bellwood, who was seventy-seven years of age, had been connected with Messrs. Rose, Downs and Thompson, Ltd., for upwards of sixty years and had been a director since 1918.

Mr. Lewis A. May

Managing director of Lewis A. May (Produce Distributors), Ltd., and also chairman of Golden Block, Ltd. (Margarine Manufacturers), and managing director of Macline Foods, Ltd. (proprietors of Uncle Mac's Puffed Wheat), Mr. Lewis A. May has just been selected by the North-West Camberwell Conservative and Unionist Association as their candidate for that division. Mr. May will be standing at the next election in place of Major the Hon. O. Guest, the sitting member, who is retiring.

* * *

Brave New World

A comedy entitled *Brave New World* has been written by our old friend Mr. A. Ll. Matthison, who had, we thought, won a well-earned retirement from work, but we see he is described as managing director of his old firm again, Messrs. Arthur Holden and Sons, Ltd., of Bordesley Green Road, Birmingham, 9, a factory we know well, as no doubt many of our readers do.

The book afforded us much pleasure and entertainment, and we commend it to all the friends of the firm of Holden and to all our readers, particularly as Mr. Matthison announces that all the profits from the sale and royalties will go to the Merchant Seamen's Comforts Fund.

* * *

Royal Congratulations

The Queen, as Patron of the Women's Land Army, has sent a message of congratulation to members of the Land Army working in the county of Kent, expressing Her Majesty's admiration for the magnificent way in which they have played their part under direct fire from the enemy. The message has been conveyed in a personal letter from the Honorary Director of the Women's Land Army, Lady Denman, to every one of the 4,000 members in the county. Of the 8,000 "doodles" intended for London, official figures record that Kent took 2,400, many falling in "open country," where land girls and their fellow farm workers with stoical indifference continued to carry on with the vital job of securing the harvest.

Shortage of Fish Barrels

The shortage of barrels is regarded as likely to limit fish-curing activity in the north-east of Scotland, where curers have commented upon the high price of staves and the scarcity of barrels. Only some four or five curers intend to make barrels for next season, it is stated in Aberdeen.

The point was confirmed by Mr. James A. Sutherland, of Peterhead, who said that the shortage of barrels was now serious, as was also the labour supply.

There are at present considerable stocks of barrelled herring lying in the north awaiting shipment to the Continent, and this is holding up a considerable volume of material, some 20,000 being held in Fraserburgh alone.

Unless some steps are taken to correct this position by the increase of the supply of timber and labour to meet the requirements of the industry, it is not anticipated that there can be much activity during the coming autumn.

* * *

A B C of Temperature Control

A series of papers is available which virtually tells the whole story of temperature control for heating and industrial purposes.

It is becoming universally recognised that the automatic control of temperature for space heating and for a wide variety of heating and cooling processes is essential for economy of plant operation. In a great many instances accurate temperature control is the final answer to the problem of meeting the intensified fuel situation.

The new series of papers offers a timely opportunity to works engineers, works managers, students, and others who are anxious to find out more about the various aspects of temperature control for heating and cooling. They have been specially prepared by the technical staff of Sarco Thermostats, Ltd., who make temperature control a special study. The papers are, of course, non-advertising and approach the subject in an entirely disinterested way. No charge is made for them.

Mashed Potato Powder

Chivers and Sons are to erect buildings in Commerce Street, Montrose, for the manufacture of mashed potato powder.

* * *

Developments in Meat Packaging

The prospect of an intensified war against Japan has led to a complete overhaul in the methods of packaging war stores. A development arising out of this promises to revolutionise post-war packaging of cooked and prepared meats.

This discovery, so far as the meat trade is concerned, is Pliofilm. This is a new transparent packaging material perfected in the vast laboratories of the Goodyear Tyre and Rubber Company.

This new material is tasteless, odourless, waterproof, vapour-proof, and moisture-proof. It is prepared in sheets of crystal-clear transparency and will conform to all shapes. Trade, brand, and makers' marks, however, may be printed on it in fast colours. Articles wrapped in this new material are hermetically sealed by a simple heat process, for Pliofilm will seal to itself a temperature range of 250° to 300° F., giving autogenous bond. It is insoluble in alkalies, water, and all paraffin base oils and greases, and is resistant to the action of dilute acids and alkalies.

Realisation of the wastage and damage of stores and equipment in the North African campaign, which could have been avoided had scientific packaging been used, led to the appointment of an Anglo-American Packaging Committee by the Ministry of Food. The committee is headed by Sir Robert Barlow. In connection with this research work Mr. Hubert G. Starley, appointed by the Army Council, has visited America twice. Many of the results of the committee's work were recently shown at the Central Ordnance Depot. Outstanding in the committee's investigations was Pliofilm.

Of the many results obtained by rigorous tests of the new wrapping material, shrinkage tests with cooked meat are particularly notable. A typical test showed that after seven days in a cooler of 40° F. a Pliofilm-wrapped standard meat loaf

showed only ½ oz. shrink, while a conventionally wrapped meat loaf lost 9 ozs. Under commercial tests Pliofilm-sealed loaves have been kept three weeks at 72° without moulding.

The Pliofilm wrapping costs less than standard heavy cases. The material is sufficiently tough and durable to withstand abrasions, tears, and punctures likely to be encountered in shipping.

Packaging Pliofilm has been produced in a variety of qualities, depending upon the use, and in a range of standard gauges varying in thickness from ·0002 inch (20 gauge) to ·0025 inch (250 gauge). It has been regularly furnished in rolls in width up to 55 inches and can be slit into narrower widths to the nearest 1/64 inch to a minimum of 3/8 inch.

For the moment the material is exclusively reserved for the air forces of the United Nations. After the war, however, it will be manufactured at the Goodyear factory and will be available to British producers and manufacturers for the home and overseas markets.

* * *

Paper for Food Packing

The Ely Paper Mills at Cardiff is one of the largest paper-making units in Great Britain. During the past ten years, in addition to the manufacture of fine printing and writing papers, Thomas Owen and Company, Ltd., have specialised in the manufacture of numerous special papers for food packing. They manufacture pure vegetable parchment of all kinds to standard specifications on the largest vegetable parchment machine in the world. Vegetable parchment is well known as being the most perfect food wrapper for moist and greasy foodstuffs, and for special packaging it may be made absolutely airproof. Other specialities are high-grade bleached greaseproof paper for the packing of biscuits and dry foodstuffs.

The firm were pioneers in this country in the production of glazed transparent papers, popularly known in the trade as Glassine. This paper may be made in any colour for special purposes, and the chocolate-coloured variety has been used almost exclusively during the war for the packing of chocolate by the principal manufacturers. Plans have already been made for post-war developments in these grades of paper.

* * *

Mr. H. W. Wadsworth

After having been associated with United Glass Bottle Manufacturers, Ltd., for the last twenty-three years, Mr. H. W. Wadsworth is joining, in January, 1945, the board of the Graham-Enock Manufacturing Co., Ltd., dairy and refrigerating engineers.

Mr. Wadsworth's genial personality is widely known in the dairy, and to a lesser extent to the brewery and mineral water industries, and he is universally respected throughout the country. His influence in the milk industry is not only reflected in the progressive increase in the sales of U.G.B. milk bottles, but in his contribution to placing the industry on a higher plane compared with twenty years ago. Among the many qualifications which H. W. W. possesses is the ability to retain his customers as friends, many of whom have attributed some of their success to the wise counsel and good advice which they have received from him on the industry's general technicalities, apart from the many contributions he has made to the technical improvements in design and construction of milk bottles.

He has rendered signal service to the dairy industry on the many Government and other committees on which he has served.

Mr. Wadsworth, as may be less well known, served in the 22nd Battalion London Regiment (The Queen's) during the last war and was mentioned in despatches.

We feel sure his many friends in the trade will wish Mr. Wadsworth continued success in his new sphere with the Graham-Enock Manufacturing Co., and this enterprising company is to be congratulated in securing the services of Mr. Wadsworth for their post-war plan of development.

* * *

Dr. Norman C. Wright

Dr. Norman C. Wright, Director of the Hannah Dairy Research Institute, Kirkhill, has left Ayr for the Middle East, where he is to study and report upon certain aspects of agricultural stock. It is understood that he will visit Cyprus, Abyssinia, Iraq, and Persia in the course of his visit, which is to extend over six months. It may be recalled that in 1936-37 Dr. Wright was invited by the Viceroy to visit India and report on the cattle and dairy industry there. M.A.(Hons.) and D.Sc. of Oxford and Ph.D. of Cambridge, Dr. Wright was on the staff of the National Institute for Dairying at Reading when he went to the United States as a Commonwealth scholar. On his return he became first member of the staff of the Hannah Institute, and was appointed director two years later.

* * *

Boiler Blow-Down

There is surprising ignorance about boiler blow-down; why, when, and how much is necessary, states the Ministry of Fuel and Power. The general impression is that boilers are blown down simply to blow out sediment and mud from the bottom of the shell or drums; and that by blowing down, scale is lessened.

Little is known about the safe limits of concentration of the salts in the boiler water in relation to priming. The hydrometer is regarded as a scientific instrument only to be handled by the chemist. Even when a chemist is employed, would it be true to say that his reports are understood?

Undoubtedly, there is much about boiler blow-down which so far has been a "closed book" to many works engineers and boiler-house men. Much depends upon correct blow-down conditions, and some authoritative guidance on the subject is timely. This guidance is offered in a new bulletin issued by the Ministry of Fuel and Power, and every steam-boiler user will find it to be of the greatest benefit.

The bulletin begins by explaining why blow-down is necessary. Having made that point clear, it gives a useful guide as to the best time to blow down. It then pro-

ceeds to describe the routine control of blow-down and to examine the factors which influence the amount of blowing down necessary to prevent priming.

The value and use of the hydrometer in testing samples of boiler water to ascertain the amount of dissolved solids it contains is dealt with at length. The need for careful supervision where continuous blow-down is fitted, in order to prevent unnecessary loss of heat (and fuel), is stressed.

Then follows a section on heat recovery from continuous blow-down. Much has yet to be done in this direction as a source of fuel saving. It would be true to say that there are still many steam-boiler users who do not realise that they have in their boiler blow-down much useful heat that can be put to work and so reduce the amount of heat to be provided by the boilers. The bulletin also gives very clear directions for calculating the amount of blow-down required, and the information will go a long way to clear up doubt which exists on this point.

Copies of the bulletin have been widely distributed among steam-boiler users, and it is hoped that it will be welcomed as a valuable aid to further fuel economy.

The bulletin is available free of charge from the Ministry of Fuel and Power, London, or from Regional Offices of the Ministry.

* * *

Post-War Foodstuffs Possibilities

Possibility of great developments in pre-cooked foodstuffs after the war was mentioned by Sir John Boyd Orr, Principal of Rowatt College, Bucksburn, recently. He was principal speaker at a conference of local branches of the Workers' Educational Association and Ministry of Labour Staff Association held in the Regal Rooms, Dundee.

Dealing with the Hot Springs Conference, he advocated food on the health standard to meet the nutritional needs of everyone and improved housing. The two were interlocked. If these were provided, he said, it would put ten years on the life, on an average, of every child born in Scotland.

Food production would stimulate employment and increase world trade. The world has become so small that some form of world government is inevitable, with nations co-operating for the benefit of all.

There was a possibility after the war of a great increase in pre-cooked foodstuffs which only required to be heated.

* * *

National Canning Company

At the thirteenth annual meeting of the National Canning Company, Ltd., a dividend of 10 per cent. on the ordinary share capital was declared.

The chairman, Mr. S. W. Smedley, said: "In my statement to the shareholders last year, referring to the prospects for the year to May, 1944, I said that the restrictions then in force had caused our turnover to contract, and indicated that that state of affairs was unlikely to change. The restrictions were in no way abated, and we had to contend with the additional difficulties of price limitations and the compulsory diversion of labour to other work. Despite these unavoidable handicaps, I am glad to be able to tell you that while the gross earnings of the company and its subsidiaries for the year under review have shown a decline, the combined available earnings, after excess profits tax, were just over £100,000 after all charges other than income tax—*i.e.*, approximately the same net result as that obtaining during the past few years.

"So far as the year to May, 1945, is concerned, the two dehydration plants, to which I referred last year, recently commenced operations, and I also hope that before long we shall be allowed to resume the production of frosted foods.

"In some directions since May last restrictions on the production of canned fruits and vegetables have been even greater than last year, but recently we have been given to understand by the Ministry of Food that from now onwards we shall be allowed considerably more latitude both in the nature and quantity of our packs, and also that there will be a sizable increase in the quantity of canned goods we may offer to the public. In view of these factors it is my expectation that we shall be able to catch up the leeway which has occurred since May and, unless the labour situation becomes more difficult, the results of the current year's working should be quite satisfactory."

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British Sugar Corporation, Ltd.

At the eighth annual meeting of the British Sugar Corporation, Ltd., the chairman, Lieut.-Colonel Sir Francis Humphrys, G.C.M.G., G.C.V.O., K.B.E., C.I.E., stressed the importance of beet production. He said:

"The sugar-beet crop is continuing to play a highly important part in British agriculture, particularly in those arable areas where the crop has become firmly established as the pivot of the farming rotation. It is no exaggeration to say that hundreds of thousands of acres of land are at the present time being maintained in a high state of fertility as a direct result of growing sugar beet. The by-products — pulp, crowns, and leaves—amounting in 1943-44 to more than four million tons, made an invaluable contribution to the maintenance of the livestock industry in this country.

"The yield of beet per acre was once again above the pre-war average, and farmers and workers are to be heartily congratulated on the successful harvesting of so large a crop. The whole crop of beet was grown from seed entirely produced in this country.

"As it was clear that the presentation of the final accounts to the shareholders would be delayed through circumstances outside their control, your directors have already declared an interim dividend of 4½ per cent., less income tax, absorbing £112,500. They recommend that no further dividend be paid and that the balance of £34,626 be carried forward."

The report and accounts were circulated and were unanimously adopted.

* * *

Tate and Lyle, Ltd.

At the forty-second annual general meeting of Tate and Lyle, Ltd., a final dividend on the ordinary stock of 10 per cent., making, with the interim dividend, 18½ per cent. for the year, less tax, was approved.

News from the Ministries

Unsalted Cake Margarine

The Ministry of Food announces that unsalted cake margarine will again be available for all trade users at 2s. per cwt. above the price of salted cake margarine.

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Margarine in Bulk

The Ministry of Food announces that as from December 10 the price of "Special" margarine in bulk with wrappers included will be reduced by 2d. per cwt.

* * *

Changes in National Flour

The rate of admixture of imported flour has been increased to 12½ per cent. in all areas of Great Britain and Northern Ireland.

The change took effect from Monday, November 20.

* * *

Prices of Oils and Fats

The Ministry of Food announces that there will be no change in the existing prices of refined oils and imported edible animal fats allocated to primary wholesalers and large trade users during the eight-week period December 10, 1944, to February 3, 1945.

* * *

The Labelling of Food Order

The Ministry of Food announces that following further representations from manufacturers as to the difficulty of obtaining new supplies of labels and packaging material and disposing of existing stocks, the Labelling of Food Order (S.R. & O. 1944 No. 738) will be amended to come into force as follows:

(*a*) As regards advertisements other than labels in which presence of vitamins or minerals is claimed or suggested, January 1, 1945.

(*b*) As regards labels:

(1) Sales otherwise than by retail by a manufacturer, May 1, 1945.

(2) Sales otherwise than by retail by a wholesaler, August 1, 1945.

(3) Sales by retail, November 1, 1945.

Maximum Prices Change

The Minister of Food will shortly make an Order amending the Pickles and Sauces Maximum Price Order.

The amendment, which will require the name and address of the manufacturer to appear on containers of pickles and sauces, will renew the provision contained in the previous Maximum Price Order relating to these products. The requirements in other respects of the Labelling of Food Order (S.R. & O. No. 738) of 1944 will continue in force.

* * *

Divisional and Local Organisation

Mr. J. R. P. Postlethwaite, C.B.E., has resigned his appointment as Divisional Food Officer for the London Division on taking up service under U.N.R.R.A. He left the Ministry on November 30, 1944.

Mr. Postlethwaite has served under the Ministry of Food since the outbreak of war and has held the office of Divisional Food Officer since November, 1940, first in the South-Eastern and later in the London Division.

The Minister wishes to place on record his appreciation of the valuable services Mr. Postlethwaite has rendered to the Ministry in the various offices which he has held.

Sir Basil A. Kemball-Cook, K.C.M.G., C.B., who has served as Deputy Divisional Food Officer, will succeed Mr. Postlethwaite as Divisional Food Officer for the London Division as from December 1, 1944.

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Mr. Graham Kay

Mr. Graham Kay has asked to be released from his appointment as Finance Director of the Cereal Products and Bakeries Divisions in the Ministry of Food as at December 31.

The Minister has accepted his resignation with regret and has taken the opportunity of expressing his appreciation of Mr. Kay's services to the Ministry.

Fish Cakes

The Minister of Food has made a new Order (S.R. & O. 1944 No. 1278) amending the Fish Cakes (Maximum Prices) Order (S.R. & O. No. 1593) to increase the minimum fish content and minimum weight of fish cakes and to provide for a corresponding increase in the maximum prices. At the same time the kinds of fish allocated for the fish cakes trade will result in a greatly improved product. The new Order came into force on November 26, 1944.

* * *

Tartaric Acid and Cream of Tartar

The Minister of Food has made an Order (S.R.O. No. 1279, 1944) dated November 29, revoking the Tartaric Acid and Cream of Tartar (Control and Maximum Prices) Order, 1944 (S.R.O. No. 2, 1944).

The new Order repeats the main provisions of the old Order, but prescribes maximum prices on sales by first-hand distributors and distributing dealers licensed as such, and separate prices for sales by wholesalers.

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Fibreboard Containers and Packing Cases

The Ministry of Supply draw attention to the importance of conserving for re-use fibreboard containers and packing cases. By so doing firms are not only helping to maintain the supply of containers for their own requirements, but are also saving the importation of wood pulp and the manufacture of new board. The saving thus effected results in relieving the strain on currency, shipping space, labour, and coal, and is thus a valuable contribution in relief of all these problems.

It is essential all should play their part in this important work by carefully preserving all fibreboard containers and packing cases when their contents are removed. The shortage of paper and board is likely to continue for some time, and there must be no question of relaxing our efforts. Containers not fit for re-use

should be disposed of either to the local authority or to a waste merchant, in order that they may be returned to board mills for repulping.

* * *

Ice-Cream Ban Lifted

The Minister of Food announces that the Ice Cream (Prohibition of Manufacture and Sales) Order (S.R. & O. No. 1962), 1942, has been revoked as from November 16, 1944.

Allocations of ingredients were to be made to the trade as from December 10, but owing to difficulties of man-power and transport it may be some time before ice cream is generally available all over the country.

Producers are reminded that the use of milk and certain milk products in ice cream has been prohibited since April 1, 1941, under the Use of Milk (Restriction) Order. Special arrangements, however, are being made to allocate skimmed milk powder which is not suitable for household milk to manufacturers on the basis of their entitlement to fat, and to authorise its use in ice cream.

* * *

Threshed Home-Grown Peas

There will be no change in prices for threshed home-grown peas of the 1945 crop. The standard price of 47s. per cwt. for threshed peas containing 15 per cent. of waste will be the same as for the current year, and similar additions or deductions will be made according to the percentage of waste below or above the standard of 15 per cent.

The Ministry of Food again undertakes to purchase between January 1, 1946, and June 30, 1946, at the appropriate specified price to the grower, all threshed home-grown peas of the 1945 crop which are in dry and good merchantable condition, and for which the grower or contractor cannot find a buyer.

This undertaking applies to threshed home-grown peas of the following varieties: Harrison's Glory, Dutch Marrowfats, Lincoln Blues, and small Dutch Blues. Intending growers of threshed home-grown peas are advised where possible to make contracts for the 1945 crop.

* * *

The Pickles and Sauces Order

The Minister of Food announces that, in order to overcome difficulties of obtaining new supplies of labels and disposing of existing stocks, the Pickles and Sauces Order (S.R. & O. 1944 No. 865) will be so amended that the labelling requirements will come into force on the following dates:

(1) For sales otherwise than by retail by a manufacturer, May 1, 1945.
(2) For sales otherwise than by retail by a wholesaler, August 1, 1945.
(3) For sales by retail, November 1, 1945.

Overseas Items

Orange Contract Pleases Valencia

Britain's contract for 1,000,000,000 Spanish oranges has caused deep satisfaction in the Valencia region.

The prosperity of the whole province is so closely bound up with the United Kingdom that this renewal of traditional commercial relations on a large scale ensures its economic stability for at least a year.—*Reuter.*

* * *

Nutrition in Eire

The Medical Research Council of Ireland, it is announced, is "investigating the basis for a suitable dietary scale which would provide authoritative standards essential for the further study of nutritional problems," and when the standards have been determined and agreed upon it is proposed that "a nutritional survey" will be carried out in certain areas.

South American Fruit

U.S. fruit interests are feeling some concern at the rapid development of orchards in South America, particularly in Argentina and Chile. U.S. varieties such as Delicious apples and Bartlett pears are being grown successfully in those parts, and the crops ripen in the winter "just in time to take the cream of our markets," as one U.S. expert declared.

As a result of a conference of Pacific Coast fruit interests, *Better Fruit*, the organ of the Pacific North-West growers, called for a National Fruit Council "to gain and hold our share of national and foreign markets in the post-war world."

Apprehension is felt that "this cheap South American fruit will be sent to England and France, which have been among the best of our foreign customers, at corresponding periods of scarcity there."

Batata

On the experimental stations of the All-Union Scientific Research Institute harvesting is in full swing in the sub-tropics of Tadjikistan. The Stalinabad Experimental Base and the Dinau Station have finished harvesting the *batata*. The yield from the crop is ten times as large as that from potatoes, and works out at over 27 tons an acre. Some types of it, as regards nutritive qualities, are much superior to the potato. The amount of starch in the *batata* is 28 per cent., while in potatoes it is only 15 to 18 per cent.

* * *

Pelleting of Sugar Beet Seeds

The development of a new process for the pelleting of sugar-beet seeds, which it describes as a new step promising to lead the way in making the U.S. self-sufficient in its sugar requirements, has been announced by the Dow Chemical Company.

The new process virtually assures elimination of hand labour in cultivation of sugar beets, the company officials say, and provides a tremendous saving in seed and crop loss. The seed pellets prepared by the new process are perfectly round, of uniform size and weight, and each contains only one seed germ. Thus they may be used in a precision planter, permitting accurate spacing of seed and later cultivation entirely by machinery.

Because sugar-beet seeds contain a number of seed germs, it was first necessary, before any coating could be applied, to separate them into units containing only one germ. This has been done through a method of segmenting multiple-germ clusters. The pelleting technique was then worked out in which single seeds are put through a specially designed machine that coats them with a mixture of chemicals. The company claims the coating material will not crumble or disintegrate during handling or storage, but will dissolve immediately upon contact with the moisture of the soil and make seed grow faster and protect the emerging plant from disease.—*Reuter's Trade Service.*

* * *

Rebirth

Following behind the advancing Red Army as they liberated Soviet soil came food workers to restore essential industries. Already about a hundred sugar refineries, 26 canneries, 80 alcohol distilleries, 500 flour-mills, and 500 bakeries have been restored.

In the Ukraine sugar factories are already handling this year's beet crop. Canneries are at work in the North Caucasus, the Krasnodar and Stavropol territories, and the Rostov region, and restoration work is going ahead on others in Kerson and Moldavia. Over 400 State farms controlled by the People's Commissariat for the Food Industry are actively working.

Restored wine factories will this year supply the country with best quality Caucasian, Crimean, and Bessarabian wines, and also with Kizlyar cognac. The Don Valley Wine Trust has resumed production of champagne.

To Dehydrate Mutton

Pre-cooked and dehydrated mutton will be produced at a plant to be built in Ranipet, India, according to word received from Madras, India. The project is said to be the outgrowth of recommendations by the United Kingdom dehydration mission to India.

* * *

Meat Sterilisation

Improved meat sterilisation through dielectric heating is foreseen by the Induction Heating Corporation, New York City, one of the largest producers of electronic heat-treating equipment for the metal industries. The 3½-kw. generator used in connection with the treatment is said to be a versatile and reliable piece of equipment, embodying principles adaptable for meat sterilisation. The manufacturer states that, unlike most generators, this equipment can be separated from the electrodes so that greater efficiency can be attained.

* * *

". . . Land of Milk and Honey"

Canada is a land of milk and honey, judging from the Agriculture Report issued by the Dominion Bureau of Statistics.

Canadian bins are well stored with potatoes, wheat, corn, sugar beet and other field products. There is an abundance of honey and a big increase in dressed poultry and eggs.

The butter shortage is the only dark spot, and further rationing will be introduced to balance the depleted supply.

The butter problem is due to the increased consumption of fluid milk, but it is hoped the position will improve through the increased number of dairy cows bred and more cows coming into lactation.

The potato crop this year totals 47,540,000 cwt. compared with 43,541,000 cwt. last year. Sugar beet production has increased this year to 608,000 tons from the 1943 figure of 433,300 tons.

Canadian wheat in store or in transit in North America on October 5 totalled 313,896,600 bushels as compared with 373,188,583 bushels a year ago.

New Zealand Eel Industry

Proposals have been made recently for the establishment of an eel industry in New Zealand. It has been calculated that about 5,000 to 10,000 tons of eels could be obtained from New Zealand per annum. Eels contain an abundance of fat-soluble vitamins and would offer a useful supply for the starving people of Europe.

An officer of the Department of Scientific and Industrial Research has announced that he has been in touch with the British Ministry of Food and also with U.N.R.R.A. about the possible development of an export industry. Britain has asked for a trial shipment of half a ton. Before the war eels were imported into Britain from Holland, Denmark, and Ireland. Live eels sold at 1s. 3d. per pound, compared with 6d. and 8d. in the frozen state.

It is stated that 5,000 tons of eels have a potential yield of 800 tons of oil, worth about £32,000, plus an amount of fertiliser worth about £10,000.—*Reuter's Trade Service.*

* * *

Canadian Eggs for Britain

Mr. W. A. Brown, chief of the poultry production and marketing services of Canada, told the Quebec Poultry Association Convention recently held there that Canada expected to export 100,000,000 dozen eggs next year and they would nearly all be for Britain. Canada's export trade had risen from 1,500,000 dozen before the war to 80,000,000 dozen this year.

He issued a warning that the increased wartime cost must be reduced if Canada was to maintain its great British market. Britain at war had learned the values of nutrition in making strong, healthy people, and he anticipated after the war an increased demand for eggs at pre-war figures.

Post-war quality of eggs must be higher, but production costs must be lower if the British market was to be held against other countries.

He suggested that an Empire standard of eggs should be adopted.—*Reuter.*

The Story of Cloves

Produced by the Clove Growers' Association of Zanzibar, a brochure which has been published recently tells the story of clove spice. Eighty per cent. of the world's supply of cloves comes from the British Protectorate of Zanzibar and its neighbouring island of Pemba. Three directions of outstanding importance in the application of cloves and their distillates are: In some parts of the world the most popular cigarettes owe part of their delicate aroma to an admixture of cloves. Some of the most highly prized and universally popular cosmetics owe much of their charm to a certain distillate of cloves. A third use of cloves, or of the essence, is its application to preparations for commercial and medicinal use. Its preservative and antiseptic qualities in the form of an essential oil are used in many varieties of preparations —foods, medicines in liquid and tablet form, perfumes and ointments.

"Zanzibar," the brochure states, "is virtually now the only place in the world the prosperity of which depends primarily on the clove industry."

* * *

Penicillin Mould Culture

Since 1941 the Western Regional Research Laboratory of the U.S. Department of Agriculture has been working to find some use for the 20,000 tons of asparagus butts that accumulate each year at canneries in California, states the *Canner*.

It was found that asparagus juices crushed from the butts may be used for penicillin mould culture.

Now at the Stockton, Calif., plant of Flotill Products, Inc., first commercial-scale trial runs of asparagus juice production are being conducted. The plant will provide 1,400 lb. of concentrated liquor manufactured from waste asparagus butts from canning lines and will pack for the remainder of 1944 whatever material is possible for the use of commercial laboratories interested in using it for penicillin culture and extraction.

Corn-steep liquor is now commonly used for penicillin mould culture.

OBITER DICTA

● I am not a Pests Officer. I do the work.—*A witness in a court case describing himself as a vermin killer employed by the Essex War Agricultural Committe.*

● Tomato and chrysanthemum top dressings, also Dr. Bewley's special food for Potentates.—*Advertisement in a Rochdale paper.*

● Of all the foolish orders this, which provides that carrots should not be sold unless they are tied up in bunches, is the most nonsensical of all. No one but a fool drafted the order.—*Mr. I. Turberville Smith at Slough Petty Sessions.*

● Just as some connoisseurs approach perfect coffee as a Platonic ideal incapable of attainment in this life, so the immaculate kipper is generally regarded as a limiting conception.—*"The Scotsman."*

● We know the difference between good and bad. We don't need scientific research to tell us, and there is no need for improving the standard of kippers at North Shields.—*Councillor James Miller, a leading North Shields kippering merchant.*

● Dried eggs resemble Humpty Dumpty in the nursery rhyme. It is easy to dry the egg in its two component parts, but it requires an expert to know how to put them together again.—*"Manchester Evening News."*

● I, as an old trade union official, do not want £10 a week if I can buy only £2 worth of stuff with it. I would rather have £5 so that I could buy £5 worth of stuff.—*Minister of Labour.*

● Should we not, as a professedly Christian country, continue to restrict ourselves to a diet that is adequate and healthy, and be willing to forgo any extra luxuries until our neighbours have enough plain food to nourish their bodies?—*Charles J. Martin, Harriette Chick, and E. Margaret Hume, in a letter to "The Times."*

● While most people in the Middle West realise that Britain is hard pressed, they find it difficult to understand that after this war Britain will need to continue growing a large part of her food, and that the United States will have to import goods if she wants an export market for food products.—*Agricultural Correspondent in "The Times."*

Macaroni in Canada

The production of macaroni, spaghetti, vermicelli, noodles, etc., in the macaroni and kindred products industry in 1943 amounted to 60,435,568 lb., with a selling value at the factory of $23,084,629. Compared with 1942, when the output was 48,957,265 lb., valued at $2,251,346, there was an increase of 11,478,303 lb. in the quantity and of $833,282 in the value. In addition to the macaroni, etc., produced in this industry in 1943, about 2,510,000 lb., valued at $166,000, were also produced in other industries, making a total production of about 63,000,000 lb. as compared with 50,442,173 lb. in the previous year.

* * *

Port Wine on Credit

Portugal will send port wine on credit to Britain after the war if the suggestion of the newspaper *Primeiro de Janeiro* is adopted. This newspaper has little faith in the future of a new American market for good wine and thinks that in peace-time the port industry must again rely on its old customers, particularly Great Britain.

These countries, however, the paper argues, will for many years have little foreign exchange to spend on luxuries. It suggests, therefore, that the wine should be exported on credit guaranteed by the foreign governments concerned and that appropriate organisations in Portugal should finance the exports on the strength of such guarantees.—*Reuter.*

* * *

Agriculture in the Caucasus

An area of over 20,000 square kilometres in the Northern Caucasus was prospected last summer by geological expeditions. Hydrogeological explorations of the steppes between Stalingrad, Salsk and Astrakhan have shown that vast territories hitherto considered as arid contain huge reservoirs of drinking water and, in the near future, will be able to grow cereals. Vast deposits of salt have been discovered in the Manych basin, and more than 100,000 tons of salt will be extracted this year.

Information and Advice

Literature on Cereal Preparation

9,616. *Required, literature on the subject of cereal preparation.* (Herts.)

The following articles appeared in FOOD MANUFACTURE on the subject of cereals:

1932. March. "Irradiated Cereal Products," p. 92.
1933. September. "Maize," T. H. Fairbrother, pp. 289-294.
1934. March. "Ready Cooked Breakfast Cereal and Puffed Cereal Food," p. 111.
1934. October. "Cereal Preparations," p. 373.
1935. September. "Cereal Breakfast Foods," J. Stewart Remington pp. 305-310.
1937. September. "Breakfast Food," p. 297.

Copies of these issues of FOOD MANUFACTURE may possibly be obtained from Books Dept., Leonard Hill Limited, 17, Stratford Place, W. 1, but they may be out of print. If so, photostat copies of the articles could be obtained at the cost of a few shillings.

Salad Cream and Mayonnaise

9,548. *Required, information concerning the differences between the summer and winter formulæ of salad cream and mayonnaise.* (London.)

Salad dressings as usually made are emulsions of the oil-in-water type, in which egg-yolk is the principal emulsifying agent. Efficient emulsification can only be effected if the two phases are liquid, and a change in state from liquid to solid—*e.g.*, by freezing—even if only of short duration, can effectively break such an emulsion.

Spoilage of salad dressings may thus be brought about by temperature changes in two ways: (1) by solidification of the oil phase, (2) by solidification of the aqueous phase. Of these, the latter is the less susceptible because the high dissolved solids content lowers the freezing point below temperatures normally experienced in this country. The oils in general use—nut, rape, cottonseed, olive, etc.—all deposit stearins at temperatures below about 10° C., and should be suspected first if separation due to low temperature is being experienced.

As far as we are aware, this type of spoilage does not constitute a serious problem in this country, where extremes of temperature are the exception rather than the rule, and we have not heard of manufacturers making any real modifications for cold weather dressings. In the U.S.A., however, separation by freezing was for many years a very serious item, and has been overcome, at least as far as the oil phase is concerned, by the use of the so-called "winterised" oils—*i.e.*, oils from which the high melting glycerides have been removed by freezing.

Spoilage of salad dressings due to freezing is dealt with by R. H. Joffé in his book *Mayonnaise and Salad Dressing Products*, published by the Emulsol Corporation, Chicago, 1942. Good accounts of the technology of salad dressings are to be found in *Emulsions*, by W. Clayton, 4th Edition, 1944 (Churchill); *Campbell's Book of Canning, Pickling and Preserving*; also a long article by Epstein, Reynolds and Harris in *Am. Soc. Bakery Eng. Bulletin*, 1937. Individual aspects and problems have been dealt with in original contributions to the technical press, and a large number of papers have appeared in *Industrial and Engineering Chemistry*.

Information Supplied

9,509. *Names and addresses of firms interested in the emulsification of glucose and cocoa butter.* (Lancs.)

9,510. *Names and addresses of firms supplying flexible superheated steam pipes.* (Herts.)

9,511. *Information regarding an antiseptic suitable for use in a food factory.* (Lancs.)

9,525. *Name and address of a firm supplying a machine for making potato crisps.* (Devon.)

9,533. *Name and address of a manufacturer of wood pulp discs.* (Scotland.)

9,534. *Name and address of manufacturers of vegetable dicing machines.* (London.)

9,539. *Information concerning balances, bunsen-burners, etc.* (Wales.)

9,545. *Information concerning photographs of wrapping machines.* (Lincs.)

9,547. *Names of firms supplying modern equipment for the production of* (a) *citric acid from lime and lemon;* (b) *blood meal, bone meal, and meat meal;* (c) *pressure cookers for cooking such roots as cassava and sweet potatoes.* (S. Africa.)

9,550. *Name of the manufacturer of a machine for opening 6-lb. cans at the rate of 200 an hour.* (London.)

9,551. *Name of suppliers of machine for opening jars and bottles.* (Durham.)

9,552. *Name of suppliers of booklet,* Food Yeast: A Venture in Practical Nutrition. (Yorks.)

9,560. *Names of suppliers of labelling machines, filling machines and cooling tanks.* (Somerset.)

9,562. *Names of suppliers of biscuit manufacturing and flour milling plant.* (Herts.)

9,571. *Information regarding the grading of peas.* (Eire.)

9,575. *Names of makers of machinery for the manufacture of margarine, vinegar and edible oil.* (Surrey.)

9,582. *Names of makers of adhesive tape to seal tins.* (Somerset.)

9,583. *Names of makers of macaroni machinery.* (London.)

9,584. *Names of makers of greaseproof lined cardboard containers.* (Yorks.)

9,585. *Information regarding the manufacture of macaroni and vermicelli.* (Lancs.)

9,586. *Names of makers of sausage casings.* (Lancs.)

9,588. *Information regarding an emulsifier to bind vegetable oil and water.* (Lancs.)

9,595. *Makers of machine for packing flour.* (Somerset.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

563,750. McGowan, J. and Lawrence, P. H.: Collapsible repeatedly usable packing cases.

563,754. Ridley, F. F., and Scholes, W.: Separation of solid materials having different specific gravities by means of liquid media.

563,762. Locker, M. Pourers for salt and pepper and other powdered materials.

563,763. Woolridge, H., and Searle, C. A.: Electric heaters applicable for preventing freezing in water pipes.

563,768. Vokes, C. G.: Filters.

563,769. Rothery, J. S.: Weighing apparatus.

563,792. Steel Bros. and Co., Ltd., and Holl, F. M.: Process and apparatus for the treatment of rice and other cereals.

563,806. Baron and Sons, Ltd., and Greenwood, H. S.: Manufacture of means for filtering air for use in mills and work places.

563,831. McKean, J. G.: Strainers for liquids.

563,861. Du Pont De Nemours and Co., E.I., and Pilcher, W. S.: Feeding of cylindrical wrappers.

Abstracts of Recent Specifications

A Composition for Producing a Potable Brew from Leguminous Plants

This invention relates to a composition for use in producing a dark-coloured potable brew, and to a method of making the composition and a potable brew obtained therefrom.

It has been found that an excellent tasting beverage may be prepared from leguminous plants—for example, alfalfa, clover, lespedeza, pea vines and the like—if they are treated and dried.

According to the invention, the leguminous plants, preferably after being crushed, are allowed to ferment, and are then dried at a temperature sufficient to destroy or partially destroy the chlorophyll, but insufficient to char the organic material. The duration of the fermentation will usually be from about thirty minutes to three days, depending on the flavour desired.

To produce a palatable beverage the dried product is boiled or steeped in water.

The flavour of the beverage is largely dependent on the period of fermentation, while, owing to the chlorophyll, a distinctive and tasty dark-coloured beverage will be produced.

The dried composition can be stored without danger of fermentation or decomposition, so that it can be used when required to produce a beverage.

The leaves of a selected leguminous plant are crushed in any suitable manner to break down the cells of the leaves.

After the leaves have been sufficiently crushed or broken, they are placed in a container and permitted to ferment for a period of from thirty minutes to three days. When the cells of the leaves are broken down, the plant enzymes and other cellular content are released. The bacteria on the plant, together with the enzymes, bring about fermentation. The fermentation may be stopped at any time by application of heat. After the fermentation has proceeded for a selected interval, the leaves are dried to the extent that the chlorophyll content is destroyed or substantially destroyed, but without appreciable charring of the organic material.

556,486. William R. Graham, Jr., and Clark W. McCarty (through Henry Withers Kickweed Jennings).

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

ZONE.—617,678. Tea and coffee. **Wilfred Calladine Abbot,** 390, Narborough Road, Leicester; Merchant.

FARALOSE.—624,761. Maltosic sugar, maltosic syrup, starch for food, invert sugar, and sugar. **Advance Technochem, Ltd.,** 37, English Street, Carlisle; Manufacturers.

DEB-ORA.—629,148. Orange Squash. **Rhysly Lloyd Davies and Gerallt Roberts Davies,** trading as **Davies Brothers,** 1, Quay Road, Neath, South Wales, Manufacturers of Cordials and Fruit Wines. (By consent.)

PEGS.—629,149. Chocolate and confectionery (not medicated); but not including biscuits. **Julien Loffet, Ltd.,** 1, Exeter Road, Bournbrook, Birmingham, 29; Manufacturers.

BUTYREX.—629,763. Flavourings for food (other than essential oils). **Scottish Flavour and Colour Co., Ltd.,** Mayfield Works, 27 to 29, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants.

FRUTALADE.—627,410. Fruit-flavoured sweetmeats and fruit-flavoured confectionery (none being medicated). **Mapleton's Nut Food Company, Ltd.,** Moss Street, Garston, Liverpool, County of Lancaster; Manufacturers.

FRU-TORIA.—627,413. Confectionery and sweetmeats comprising fruit and nuts. **Mapleton's Nut Food Company, Ltd.,** Moss Street, Garston, Liverpool, County of Lancaster; Manufacturers.

CARMEXIM.—628,917. Coffee, tea, cocoa, chocolate, sugar, rice, tapioca, sago, and spices. **Carmel Exporters and Importers, Ltd.,** 15, Seething Lane, London, E.C. 3; Manufacturers.

New Companies

Wilson (Weaverthorpe), Limited. (389621.) Weaverthorpe, Melton, Yorks. To carry on bus. of tea dealers, Italian warhousemen, bakers, etc. Nom. cap.: £5,000 in £1 shares. Dirs. to be appointed by subs. Subs.: Mrs. M. Wilson, Weaverthorpe, E. R. Yorkshire, and H. Wilson, of same address.

Howkeld Mill, Limited. (389630.) Howkeld Mill, Kirbymoorside, Yorks. To take over bus. of flour and corn millers, etc., cd. on by the Welburn Co., Ltd., at Howkeld Mill, Kirbymoorside. Nom. cap.: £1,500 in £1 shares. Dirs.: H. S. Burgess and Marjorie Burgess, both of Beckside, Thornton Dale; Alice J. Shaw and Beatrice A. Shaw, both of Welburn Hall, Kirbymoorside.

H. Tikvah, Limited. (389640.) To carry on bus. of general merchants and agents, distillers, bottlers and shippers of fruit juices, wines, spirits and cordials, etc. Nom. cap.: £1,000 in £1 shares. Dir.: J. B. Crouch, 93, Hazon Way, Epsom, Surrey.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.